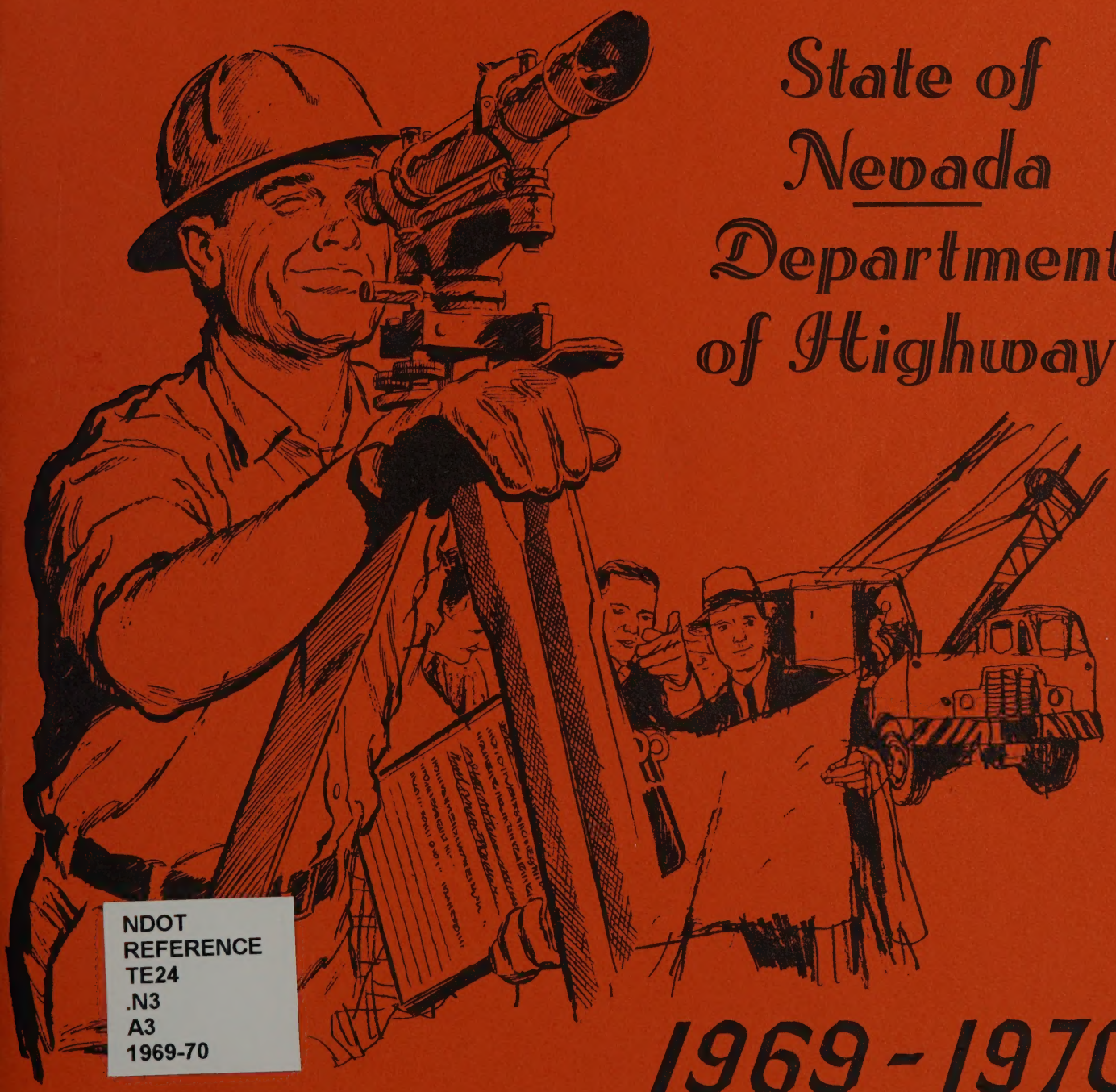
Biennial Report

State of Nevada Department of Highways



NDOT
REFERENCE
TE24
.N3
A3
1969-70

1969 - 1970

Biennial report of the Department of Highways.
Nevada. Department of Highways.
NDOT REFERENCE TE24 .N3 A3 1969-70
NDOT HQ Library - Carson City
08018455

STATE OF NEVADA

DEPARTMENT OF HIGHWAYS

Twenty-seventh Biennial Report

PROPERTY OF
NDOT TRANSPORTATION LIBRARY

Fiscal Years 1969-70

CONTENTS

Letter of Transmittal v

Highway Officials vii

Foreword viii

Section I—
- Internal Audit 1–1
- Equal Employment Opportunity 1–1
- Public Information/Public Hearings 1–2

Section II—
- Nevada Highways and Parks Magazine 2–1
- Data Processing 2–1
- Administrative Services 2–2
- Industrial Relations 2–3
  - Personnel 2–3
  - Training 2–4
  - Safety 2–4
- Purchasing and Stores 2–5
- Accounting and Finance 2–5
- Project Management 2–6

Section III—
- Equipment 3–1
- Materials and Testing 3–1
- Communications 3–2
- Construction 3–3
- Maintenance 3–3
- Architecture 3–4
- District Operations 3–5
- Map-Maintenance Districts 3–8

Section IV—
- Federal-aid Programs 4–1
- Location 4–1
- Right-of-Way 4–2
- Utilities 4–3
- Road Design 4–4
- Structural Design 4–5
- Planning Survey 4–6
  - Inventory—Road Life 4–6
  - Cartographic and Graphic Arts 4–7
  - Reproduction 4–8
  - Geodesy 4–8
  - Planning Data Processing 4–9
  - Photogrammetry 4–9
  - Flight Operations 4–9
  - Traffic Engineering 4–10
  - Traffic 4–10
  - Special Studies 4–11
  - Urban Transportation 4–12
- Legal Services 4–12

Section V—
- Appendix A—Administrative Services Office—
  - Table 1—Job Authorization Data A–1

CONTENTS—*Continued*

Table 2—Construction and Reconstruction Designated State Highway System A–1
Table 3—Contracts and Lettings A–2
Table 4—Transportation Permits A–3
Table 5—Encroachment Permits A–4
Table 6—Prequalified Contractors A–4

Appendix B—Industrial Relations—Personnel—
Table 7—Employee Turnover by Classification B–1

Appendix C—Accounting—
Table 8—Operating Condition Statement C–1
Table 9—Balance Sheet—Assets C–2
Table 10—Balance Sheet—Liabilities and Surplus C–3
Table 11—Working Capital Statement C–3
Table 12—Status of State Highway Fund C–4
Table 13—Historical Record of Receipts and Disbursements—1917–1970 ..... C–5
Table 14—Reconciliation with State Controller C–6
Table 15—Comparison—Last 10-Year Period, Construction and Engineering Expenditures C–7
Table 16—Historical Record of Federal Participation—1917–1970 ..... C–7
Table 17—Federal Funds Received by System Type and Class of Funds C–8
Chart—Federal-aid and State Revenues by Fiscal Years 1917–1970 ..... C–9
Chart—Expenditures C–10
Chart—Comparative Maintenance Costs C–11
Chart—Receipts and Disbursements Biennium C–12
Chart—Expenditure Percentages by System Type C–13

Appendix D—Materials and Testing—
Table 18—Structural Materials Lab D–1
Table 19—Chemical and Metallurgical Lab D–2
Table 20—Roadbed Aggregates Lab D–3
Table 21—Bituminous Mix Design Lab D–3
Table 22—Soils Lab D–4
Table 23—Asphalt (Bituminous) Lab D–5
Table 24—Cement Treated Base Lab D–5
Table 25—Research and Investigation D–6
Table 26—Elko Lab D–7
Table 27—Las Vegas Lab D–7

Appendix E—Maintenance—
Table 28—Contract Maintenance E–1
Table 29—Capital Improvements E–2

Appendix F—Bridge—
Table 30—Structure Summary F–1
Table 31—Structures by Counties F–2

Appendix G—Traffic—
Table 32—Highway Lighting and Traffic Signal Systems G–1

Appendix H—Legal—
Table 33—Condemnation Litigation H–1
Table 34—Tort Litigation H–1

LETTER OF TRANSMITTAL

Honorable Members of the Nevada State Highway Board and Nevada State Legislature:

In compliance with the provisions of the Nevada Revised Statutes, the Nevada Department of Highways hereby submits this, the Twenty-seventh Biennial Report for fiscal years 1969 and 1970.

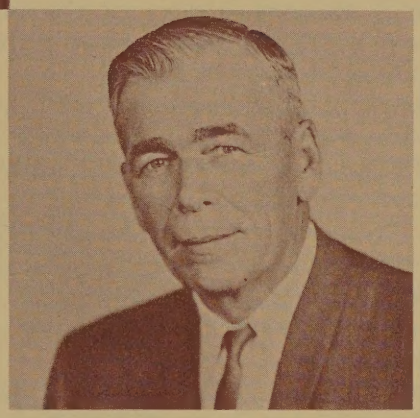
In this report we have endeavored to present the Department's accomplishments during the past biennium as briefly and concisely as possible. As can be noted, several important advances were made in highway operations as we continue our on-going program to provide the best possible highways for the motoring public.

Respectfully submitted,

JOHN E. BAWDEN
State Highway Engineer

Chairman
Highway Board
Paul Laxalt
Governor

Member
Highway Board
Harvey Dickerson
Attorney General



Member
Highway Board
Wilson McGowan
State Controller

Highway Engineer
John E. Bawden

Deputy Highway Engineer
Grant Bastian

Deputy Highway Engineer
Ralph Ottini

FOREWORD

The Table of Organization for the Department of Highways, State of Nevada, provides a balance between centralized control and decentralized operation. The basic principle of this concept is the centralization of activities covering program philosophy, objectives, and policies at the headquarters offices of the organization, with maximum decentralization of program action to the district offices. This approach provides the delegation of authority necessary to carry out effective and efficient highway operations within the scope of program policies set forth by the agency managers.

There is selective delegation of management authority to district engineers in accordance with Department policy. Delegation of authority is continually reviewed and adjusted to provide the necessary flexibility to meet constantly changing and highly variable factors affecting program actions at the district level.

The state's highway operations are administered through a headquarters and six districts with geographical boundaries.

The headquarters office is primarily a staff type organization headed by the State Highway Engineer. Under his direction are division managers, each responsible to the State Highway Engineer for one or more functional specialties, and for supervision of the personnel within their respective areas of specialization.

The district offices are each responsible for operational supervision of the state's highway program activities in a particular district. Each office is headed by a district engineer, who with his staff, administers the highway program in accordance with established policies.

During the biennium, the Department continued to modify and upgrade its management practices and procedures, as many new policies were formulated; new manuals were published by the various divisions; supervisors received management training; new coordinators and administrators were appointed; and several organizational changes made.

Through the use of new procedures and equipment, improvements were made in the services provided the various operating divisions. As the roadbuilding program became more complex and demands on the Department increased, administrative activities met the challenge.

During the reporting period, stronger coordination was established with the Federal Highway Administration in its expanding areas of transportation involvement. At the same time, the Department's administrative practices were, and will continue to be, aligned to correspond with the state's new centralization of service concept. New procedures were effected to conform with federal laws, and changes made to incorporate highway functions into centralized accounting and data processing systems.

With ever-increasing costs of labor and training the Department found it profitable to purchase a California Computer Corporation mechanical plotting system to accomplish the many tedious bridge and roadway design functions in a more expeditious manner.

The Equal Employment Opportunity office was established in compliance with the Federal Highway Act of 1968. In conjunction with this, the prequalification of contractors and review of contracts-in-progress procedures were established. In addition, a career aid training program for the hardcore disadvantaged and minority groups was successfully initiated, with many trainees receiving promotions to permanent work status.

A consultant from the Remington Rand Corporation worked extensively with central files and the district and division offices, revamping the filing systems within the Department. Utilizing microfilm, a new and complete retention of records program was developed within the requirements established by the Federal Highway Administration and in compliance with Nevada state laws.

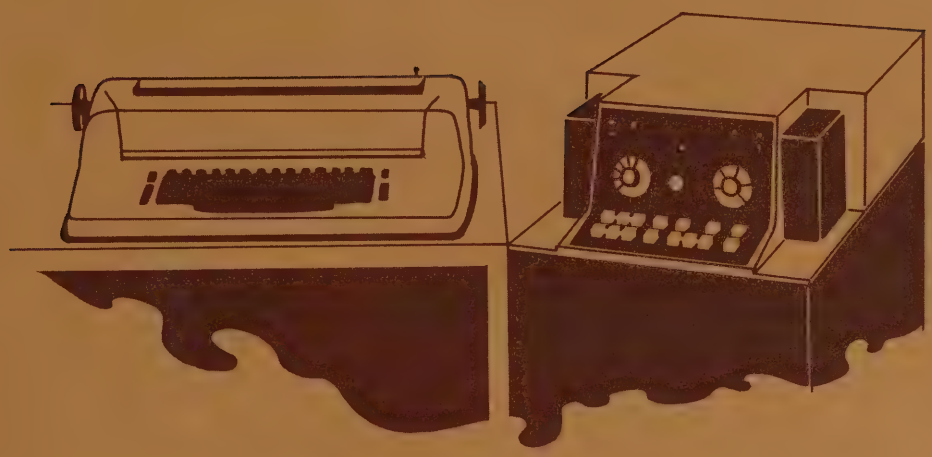
An extensive feasibility study of information systems by a consulting firm resulted in the inauguration of the Highway Management Information System. This will be a continuing, long range program to effectively utilize highway resources to produce better results on all management levels. The first step produced the coordinated effort of all divisions in establishing a milepost system for accurate recording of, and retrieval of maintenance and labor costs for each section of the state highway system.

Increased safety training and promotion programs resulted in refunds of thousands of dollars to the Department from the Nevada Industrial Commission.

The procedures for Emergency Highway Traffic Regulations were written and published in compliance with the Federal Highway Administration and the national and state civil defense agencies.

In the upcoming biennium, the Department will continue its efforts to expand and improve its services to provide the best highways possible.

SECTION I

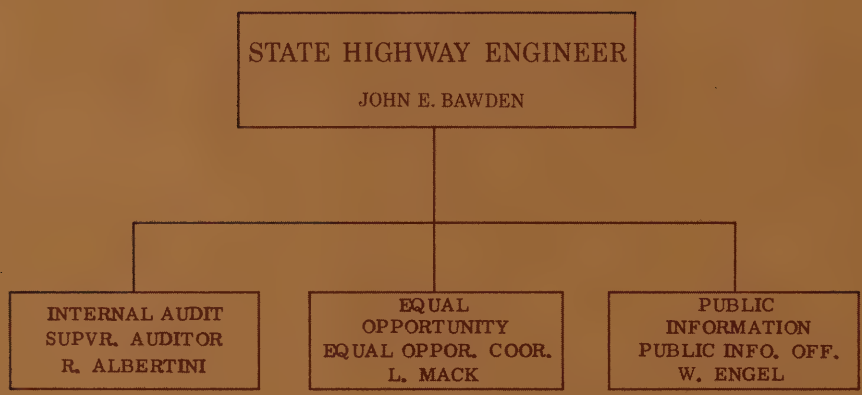


Internal Audit

Equal Employment

Public Information / Public Hearings

SECTION I


STATE HIGHWAY ENGINEER
JOHN E. BAWDEN
INTERNAL AUDIT
SUPVR. AUDITOR
R. ALBERTINI
EQUAL
OPPORTUNITY
EQUAL OPPOR. COOR.
L. MACK
PUBLIC
INFORMATION
PUBLIC INFO. OFF.
W. ENGEL

As members of the State Highway Engineer's personal staff, and reporting directly to him, the Internal Audit, Equal Employment Opportunity, and Public Information/Public Hearing section heads are responsible, in a staff capacity, for assisting and advising the State Highway Engineer in the administration of all matters relative to their areas of specialization.

INTERNAL AUDIT

The Internal Audit Section operates as a separate function within the Department. This section is authorized to review, evaluate, and report as deemed necessary on accounting records, procedures, controls and management of resources relative to all areas involving Department activities.

In keeping with the concepts of operational auditing, intensive evaluation of internal controls for all operational functions was undertaken.

The introduction of a standardized documentation system by the Construction Division resulted in a shift of Internal Audit effort during the biennium. In addition to being more descriptive of the work performed, the improved recordkeeping substantially reduced the audit effort in this area, thereby freeing additional audit man hours for other activities.

In preparation for a new audit program, an internal control evaluation of the accounting and fiscal functions was undertaken. In keeping with the concepts of "Operational Auditing," intensive evaluations of internal controls for all operational functions are currently underway.

Renewed effort is being made to update the "permanent" and "current" workpaper files, which contain important reference and research material for each audit activity.

A comprehensive *Audit Manual* is being prepared to assist staff personnel with Internal Audit guidelines. Publication is expected by the first of 1971.

EQUAL EMPLOYMENT OPPORTUNITY

As a result of the 1968 Federal-aid Highway Act, the Department of Highways initiated a formal program to assure equal employment opportunity within the agency and by those contractors employed by the agency. Written assurance by the Department which would immediately implement a program to comply with the federal regulations was required to insure continued federal-aid for the state's highway activity. Some nine assurances were signed by the State Highway Engineer on September 5, 1968. From these, the agency's equal opportunity policy and implementing instructions were developed.

In April 1969, the Department hired an Equal Employment Opportunity Coordinator (EEO) to assist the Highway Engineer in complying with the provisions of the 1968 Highway Act through the development and implementation of an EEO program. An EEO office was established and staffed, and the initial steps taken to assure agency and contract compliance.

By the end of 1969, the Department, through cooperation with many other state and local agencies, developed the first guidelines, procedures, and programs relating to EEO. A career-aid classification was established to provide for the recruiting, hiring, and training of minorities and hardcore unemployed as highway employees. Numerous meetings were held with various Negro and Indian minority groups in the Reno and Las Vegas areas, as well as with contractor organizations to explain the agency's EEO responsibilities and activities and to coordinate the total program.

Numerous meetings were held with minority groups in the Las Vegas and Reno areas, as well as with contractor organizations and governmental agencies to explain the Department's EEO program.

Orientation of Department employees was begun with a series of meetings at the district level, primarily with field personnel. Responsibilities of the resident and district engineers were outlined and the Administrator, Management Services, assigned to handle the in-house (headquarters) program. The training committee, representing each of the major divisions, was made responsible for determining the specialized training required for EEO employee orientation and for developing a suitable means to accomplish this objective.

A supervisor's manual was developed to aid in the orientation process. Additional information is being made available through the Department's EEO and personnel offices. It is anticipated that what has been accomplished to date is only a beginning and that the program will change as needed to meet the requirements of the agency. A positive effort will continue to be made to keep highway employees informed and to successfully involve them in the EEO program.

PUBLIC INFORMATION/ PUBLIC HEARINGS

The Public Information/Public Hearing Coordinator has the functional responsibility for the Department's Public Information and Public Hearing Programs.

Department public relations is a two-way process, dealing with both internal and external factions. It is vitally important for management to be informed about public and/or employee attitudes and reactions, and to act on the basis of that awareness.

Department policy is based on the assumption that in order to enjoy good public relations, it is necessary to respect the public's right to know and facilitate an awareness of the Department's activities by answering inquiries and taking the initiative in supplying information on matters of public interest and concern.

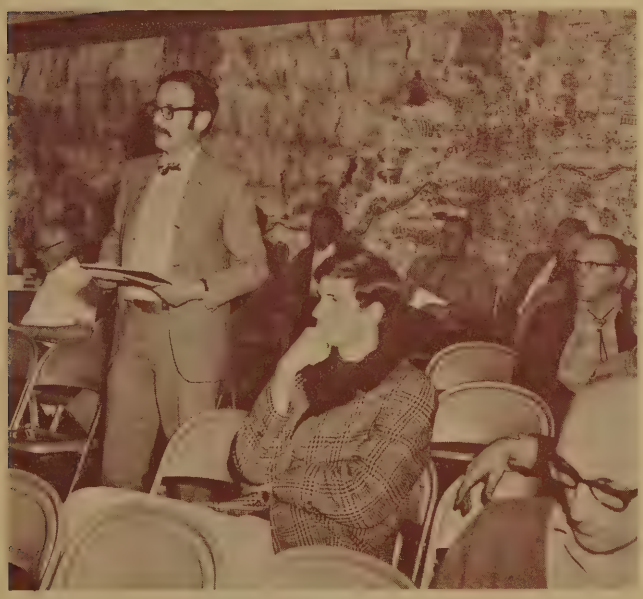
As a major focal point for the issuance of public statements, the Public Information/Public Hearing

Annual statewide Highway Board-County Commissioner meetings are particularly effective in providing factual information to state and local officials concerned with highway activities.

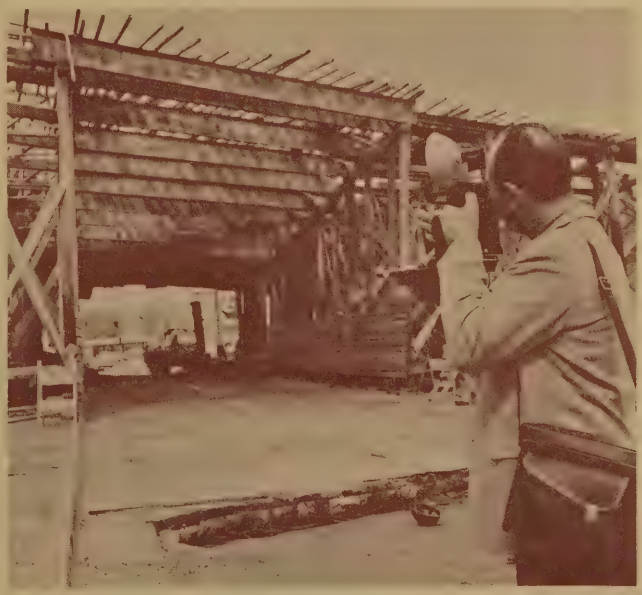
Coordinator Office produces and distributes information on all phases of highway activity to the mass news media of newspapers, radio and television.

The Public Information/Public Hearing Coordinator Office has a staff of nine persons, which includes the Public Information/Public Hearing Coordinator; District Information Officers, located in Las Vegas and Sparks; a Technical Writer; a three man photography section; and two secretaries.

During the biennium this section published literally hundreds of news releases relative to highway activities for the mass news media of newspapers, radio and television; wrote and distributed 48,000 copies of the *Highway News,* the Department's monthly employee publication; edited 6,000 copies of FOCUS, a bi-monthly publication on current Department activities, which included the construction bulletin as a supplement; produced the semiannual five-color Highway Progress Report, and a yearly update on the Interstate Freeway Report; wrote several major feature articles requiring special research for various publications; provided technical assistance to other divisions and sections within the Department in writing technical reports, papers, brochures and procedural manuals; prepared and distributed 500 copies of the Biennial Report, which included a pictorial supplement; assisted in the preparation and distribution of 800,000 copies of the Official State Highway Map; conducted and recorded weekly pre-hearing meetings; attended numerous meetings relating to highway matters on local. state and national levels; coordinated the Service Awards Program for Department employees; served on several committees concerned with the various aspects of Department operations and policy; maintained a clipping service from Nevada newspapers to provide a day-to-day account of highway news coverage to the Public Information Office as well as to other divisions within the Department; answered approximately 12,000 letters and mailed several thousand pieces of literature in response to inquiries and/or requests for information; prepared several major exhibits for Department and public use, which included the state and county fairs; attended regularly scheduled meetings with the State Highway Board; provided script to be utilized with slide and motion picture presentations; conducted classes for the Maintenance Academy and middle management personnel on the proper procedures to be used in various mediums of public information/relations; represented the Department as coordinator for public hearings; was responsible for making all arrangements for the annual Highway Board-County Commissioners meetings, conducted throughout the State; provided liaison between the Department and outside agencies in matters of mutual interest or concern; maintained a Speakers Bureau for the purpose of providing speakers on a variety of subjects, to include panel discussions, seminars, TV appearances, dedications, etc.; provided photo coverage on every aspect of highway activity; and was responsible for making the arrangements for dedication ceremonies.



Location and design public hearings are held to provide the general public with information relative to impending highway projects. The hearings are open to all concerned.



Department photographers cover all facets of highway activity, as well as providing photographs for the official state highway map.

SECTION II

Highways and Parks Magazine

Data Processing

Administrative Services

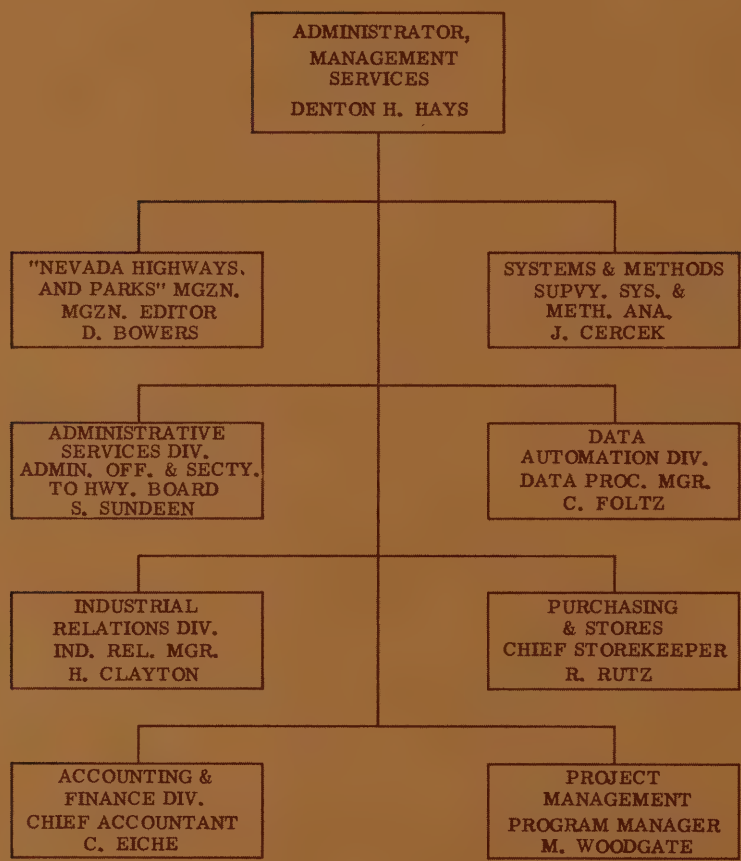
Industrial Relations

Purchasing and Stores

Accounting and Finance

Project Management

SECTION II


ADMINISTRATOR, MANAGEMENT SERVICES
DENTON H. HAYS
"NEVADA HIGHWAYS, AND PARKS" MGZN. MGZN. EDITOR D. BOWERS
SYSTEMS & METHODS SUPVY. SYS. & METH. ANA. J. CERCEK
ADMINISTRATIVE SERVICES DIV. ADMIN. OFF. & SECTY. TO HWY. BOARD S. SUNDEEN
DATA AUTOMATION DIV. DATA PROC. MGR. C. FOLTZ
INDUSTRIAL RELATIONS DIV. IND. REL. MGR. H. CLAYTON
PURCHASING & STORES CHIEF STOREKEEPER R. RUTZ
ACCOUNTING & FINANCE DIV. CHIEF ACCOUNTANT C. EICHE
PROJECT MANAGEMENT PROGRAM MANAGER M. WOODGATE

The Administrator, Management Services, is responsible in a staff capacity, for assisting and advising the State Highway Engineer in activities concerned with the Highways and Parks Magazine, Systems and Methods, Data Processing, Administrative Services, Industrial Relations, Purchasing and Stores, Accounting, and Project Management divisions of the Department.

NEVADA HIGHWAYS AND PARKS MAGAZINE

Eight issues of the official state magazine, *Nevada Highways and Parks,* were published during the biennium. Printing was done on a contract basis, as authorized by the State Printing Office.

National distribution was handled by a contract arrangement with International Circulation Distributors (Hearst), New York City. Advertising and promotion during the period was carried out, again on a contract basis, by Publishers Services Company, with offices in Reno and Las Vegas. However, at the end of the reporting period, the contract with this firm was terminated, and the advertising and promotion functions were assumed directly by the editorial office. Design and mechanical assembly of the magazine was handled by a Reno firm, Design Directions, Inc.

The number of advertisements carried in the eight issues varied from 13⅔ to 31½ pages. The number of subscribers steadily increased during the period with revenues from subscriptions, national sales, and advertisements accounting for over 40 percent of the total cost of the operation. The office staff remained small, consisting of five or six personnel for most of the biennial period.

Reader reaction to the eight issues was favorable. One series of articles published during the biennium concerned Nevada's ancient lakes. The University of Nevada Press, in cooperation with the magazine staff, is adapting this series to book format, and publication is expected in 1971. The majority of the material published in recent issues came, unsolicited, from freelance contributors from various parts of the country and a large backlog of material remained on hand.

In cooperation with the Department of Journalism, University of Nevada, Reno, the magazine conducted a six weeks' training seminar for journalism students in 1969, with a similar course planned for 1970.

As the end of the reporting period neared, the staff was working on a special issue devoted to the theme, *Nevada Looks to the Seventies,* which will include a survey of roadbuilding in the state from the 1920s to present. This special issue will be larger than usual, containing a total of 80 pages. On the average, *Nevada Highways and Parks* carried more color than similar publications from other states. A survey of 17 other state magazines revealed that they averaged 38 percent color in comparison with Nevada's average of 75 percent.

DATA PROCESSING

The Highway Department is one of several state agencies participating in a centralized state computer facility. The large IBM computer system is temporarily housed in the Highway Department building and is managed and operated by a facility staff, with all participating state agencies submitting their data to this facility for service.

The California Computer Corporation Plotter was installed and used for Road Design Mass Diagram Plots; Cross Section Plots; Profiles; Sign Plots; Traffic Signal Plots; Planning Division Future Networks for Urban Transportation Plots; Bridge Division Geometry; and Right-of-Way Engineering hard copies.

Eighteen highway personnel successfully completed programmer training and were assigned to divisional computer programming development.

As the biennium closed, the highways and parks staff was working on a special issue that will include a summary of roadbuilding in the state from the 1920s to present.

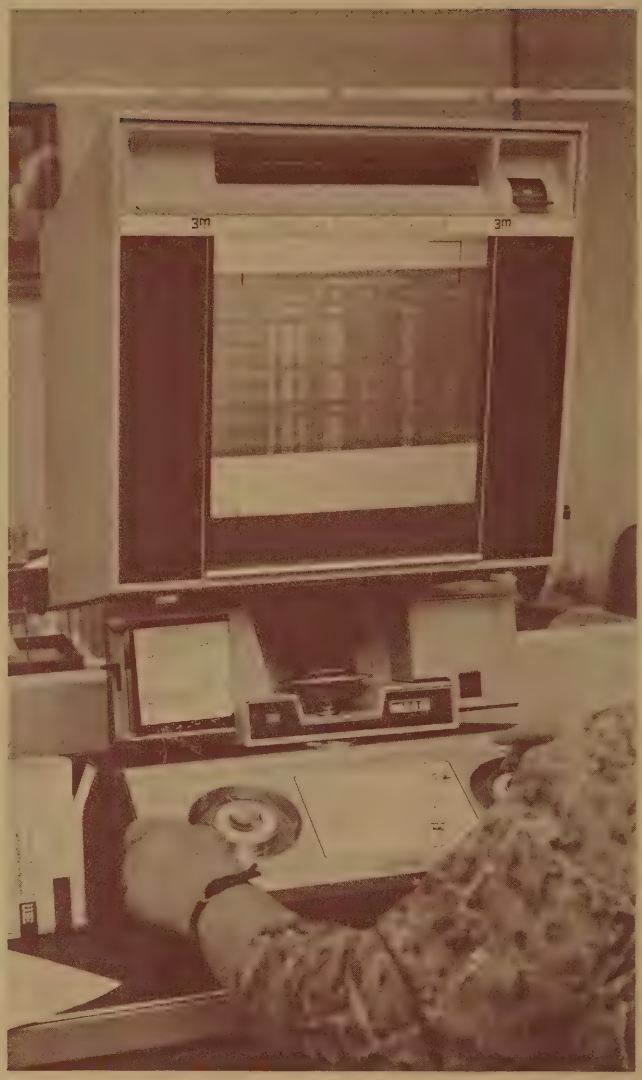
Installation of new and more sophisticated data processing equipment provided highway administrators with information on nearly every aspect of the total highway program.

ADMINISTRATIVE SERVICES

The primary function of this division is to correlate the activities of the various divisions of the Department in a cooperative effort to get a job typed, advertised, plans sent out to interested parties, and the contract awarded. This includes typing all the special provisions and related material, together with the preparation of estimates, bid tabulations and construction reports. This division also processes all prequalification statements and correspondence, as well as Highway Board of Directors material and is the only issuing office for transportation and encroachment permits.

During the biennium, IBM Magnetic Tape "Selectric" Typewriters (MTST) were installed for the purpose of improving office efficiency and economy. A time and motion cost analysis on the preparation of one 157-page contract document was conducted, comparing results of regular electric typing with those obtained from the MTST. One MTST operator completed the document in 27 hours, while it took three manual typists a total of 97 hours to complete the same project. Taking into consideration machine rental, salaries, and the time element involved, the cost of preparing this document manually was more than double that of using the MTST's.

Effective utilization of magnetic tape typewriters in the preparation of contracts and supporting documents cut operating costs substantially.



Security, rapid file retrieval, and maximum use of available filing space, are some of the benefits derived from the new microfilm filing system.

Effective utilization of the MTST's in the preparation of contracts and supporting documents by this division resulted in nationwide recognition in two leading trade magazines.

In the area of Mail and Record Management, a new and complete retention of records program was established within the Department. The microfilm filing system placed in use will provide a three-fold benefit to the agency in the way of security, rapid file retrieval, and maximum use of available filing space.

Increased emphasis was placed on the improvement of current personnel evaluation procedures, as well as formalized job standards throughout the agency.

INDUSTRIAL RELATIONS

The Industrial Relations Division has functional responsibility over personnel, training and safety. The primary function of this division is the administration of personnel regulations, processing of appointments, terminations, promotions, demotions, the application of regulations pertaining to overtime and hours of work, per diem, travel and subsistence, leave, disciplinary actions, classifications and salary plan, and personnel training and safety programs.

Personnel

During the reporting period, 351 classification studies were conducted and 10 new classes established. This included statewide studies completed on the maintenance and construction series.

This section administered, or participated in, 256 oral examinations during the biennium and accepted full responsibility for administering all examinations within the highway maintenance series in addition to the class of Equipment Mechanic II.

Departmental regulations and procedures covering subsistance and per diem, to the mutual benefit of both the state and the highway employee, were established. A continuing program was initiated to review all policies, regulations and procedures to assure equal opportunity in employment.

During the coming biennium, increased emphasis to promote improvement of the current performance evaluation procedures will continue, as will efforts to establish formalized job standards throughout the Highway Department.

A semiannual 7-day live-in training program, aimed at improving the skills of supervisory maintenance personnel, was established at the Stead Facility, University of Nevada, Reno. Closed circuit TV was used extensively for instruction purposes.

Training

The highway training program during the biennium continued in the areas of equipment operation, driver training, field testing of construction work, updating of skills in the design area, management development and the cooperative engineer development program with the University of Nevada. In addition, new programs were instituted and were well received.

The most outstanding development was establishment of the Maintenance Academy at the Stead Facility, University of Nevada, Reno. This 7-day live-in training operation was aimed at improving the skills of maintenance superintendents, supervisors and foremen. It received nationwide attention and many requests to observe the program were received from outside the Department. All requests were honored, and many "outsiders" attended.

An 18-week on-the-job training course, conducted under contract by Auto-Tronics Universal of Denver, Colorado, for 18 divisional programmers was accomplished. These employees attended class 8 hours a day.

In the past year, great emphasis was placed on training in the field of equal opportunity employment and a hardcore affirmative action program was instituted. This effort provided employment to a limited number of persons certified as unemployable. The program prepared individuals for entrance into the "main stream" of employment and was recently commended by the Federal Department of Health, Education and Welfare. To date, 32 percent have progressed to "main stream" employment, while 52 percent are still in the program.

Basic education opportunities were made available to those employees who have not completed high school. To this end, the training section was authorized to administer the high school equivalency test on a statewide basis. This was the first time the American Council of Education authorized administering this test at other than established testing centers. Seventeen Department employees successfully completed this test to date.

A course to indoctrinate supervisory personnel in the principles of equal opportunity employment was prepared and will be presented during 1970. This, and similar courses, will be presented on a continuing basis. A program was instituted to prepare engineering personnel, without a college degree, for the Engineer-in-Training Examination. This 500-hour course covered all engineering subjects and was presented by staff personnel and/or instructors from the University of Nevada under contract. A second group of employees will start the program in the fall of 1970.

As in past biennial periods, the Department's training program was enthusiastically supported by the State Department of Vocational Education. An increasing number of other state highway departments, cities, and private industries requested assistance in preparing training programs similar to those that have proven successful in Nevada.

Safety

The addition of six equipment operation instructors, one in each district, during the last reporting period resulted in fewer vehicular and personal injury accidents throughout the Department. In addition to training all field personnel in the maintenance and operation of vehicles, the equipment operation instructors assisted the safety director in accident investigations, inspections and safety promotion. During the biennium, and as a direct result of the increased emphasis placed on safety and training programs, the personal injury insurance premium was lowered from $1.70 to $1.21 per $100 of payroll.

As a direct result of the Department's on-going safety and training programs, the personal injury insurance premium was lowered from $1.70 to $1.21 per $100 of payroll.

Continuing to place greater emphasis on the overall safety program during the biennium, the safety section published a new procedures manual for flagmen; purchased a mannequin for instruction of artificial respiration and cardiopulmonary methods; instructed 502 maintenance and construction personnel in first aid methods; conducted training in firefighting techniques for all maintenance personnel throughout the state; established a safety incentive award program for vehicle maintenance; published a safety procedures section to be incorporated in the revised editions of both the maintenance and construction procedural manuals; and initiated the use of high level warning signs on a test basis within each district. These portable signs can be utilized at ground level or mounted on a vehicle and telescoped to a height of 12 feet for greater visibility and safety.

PURCHASING AND STORES

There was a general increase in all areas of stock coverage during the biennium. The stockroom inventory of July 1, 1970, showed a stock valuation of $106,000, depicting the increase of items maintained in the stockroom.

Revisions to the *Stock Catalog* were continually made and distributed to insure that every division was aware of what is maintained in stores. New supplements, which indicated changes in the items listed in the catalog, were distributed regularly.

Purchasing and stores expanded its property inventory system during the biennium to include centralization of all non-rental equipment. This comprised approximately 14,000 items of property valued in excess of $3.2 million. Two property clerks worked directly with this activity. In addition, this section was made responsible for administering the audio-visual equipment utilized within Department Headquarters.

Purchasing and stores operations was expanded to include centralization of all non-rental equipment, as well as administering the audio-visual equipment utilized within Department headquarters.

The cost for acquisition of supplies during the past 2 years totaled $1,131,814. The total amount budgeted for equipment during the biennium amounted to $397,-009 of which $197,119 was expended or obligated. Some $207,823 was budgeted for equipment purchases during fiscal year 1971.

ACCOUNTING AND FINANCE

The Accounting Division made substantial gains toward achieving recognition as the most modern such division within the state during the past 2 years. Although changes in procedures and personnel occurred, the overall efficiency of the division was improved by adoption of more modern systems and increased utilization of data processing.

During the biennium the composition of the Accounting Division changed to reflect the end of the bookkeeping era. Clerical positions were reduced in number and new positions were added to include two systems and methods analysts, two data processing programmers, and two statisticians. As a result of these changes, three employees were working outside the division on special assignments with other state agencies.

In December 1969, the Financial Management Division merged with the Accounting Division to increase the efficiency and the validity of fiscal reporting within the Highway Department, and to eliminate duplication of effort. The merger made source documents more readily available to analysts, and improved communications between those who analyzed the trends and the accountants who maintained the records. As a result of this increased communication, changes were made in the format of most reports, which in turn, provided more timely reports to management.

It is anticipated that the financial management section will continue to report on its activities as in the past, and that this section will continue to expand its role within the division to include not only the analysis of the past, but to increase emphasis on projections of income, expenditures, cash flow requirements, and the political and socio-economic climate in which the Highway Department functions.

The next several years will see major changes in the field of accounting, which will highlight the importance of data processing to this function. In anticipation of this evolution, the Accounting Division established a data processing programming section to re-program existing programs, thus increasing their usefulness; and to compose programs needed to meet the envisioned requirements of central data processing within the concepts of the state central accounting facility.

The systems and methods section of the division increased its personnel in anticipation of demands that will be placed upon it. This section also became involved in liaison work between the Highway's Accounting Division and the central accounting facility. In addition, systems and methods personnel began analyzing existing jobs and desk operating procedures to increase efficiency.

The heart of the Accounting Division is the general

Despite changes in procedures and personnel, the overall efficiency of the accounting division was improved by adopting more modern methods and the merger with the financial management division.

ledger section, which maintains the books on income, and encompasses the main categories of federal-aid, state impost or user revenues and miscellaneous income, and expense, which is broadly broken down into the main categories of construction, maintenance and administration.

As a result of implementing modern office and management techniques, the general ledger's team of five personnel maintains records on accounts payable to some 2,000 vendors; makes daily deposits averaging 100 entries of checks and monies received; and issues an average of 7,000 checks each month to employees and for Highway Department business transactions.

Federal-aid billing was the full-time job of five personnel within the Accounting Division's federal-aid section. This section maintained records during the biennium that resulted in nearly $83.8 millions of income to the Department to pay the federal government's share of the right-of-way, preliminary engineering, and construction of Nevada highways.

The federal-aid section is comprised of five personnel, cross trained, who maintain records on, and audit some 75,000 line item entries in an average month. With the aid of data processing this mass of detail is worked by system into vouchers to the federal government during the life of projects, and into final vouchers upon completion of the contracts.

PROJECT MANAGEMENT

The Project Management System is a management tool for defining and integrating events which must be accomplished on a timely basis to insure completion of program objectives on schedule. It is a means of bringing management's attention to problem areas requiring remedial decisions and/or areas that require trade-off of time, resources, or technical performance. It also pinpoints the relatively critical areas of effort that may require remedial decisions, and/or activities where surplus time exists and some delay will not hamper the ability to meet objective deadlines.

The Project Management System reflects the complex interrelationship of a large number of activities, which make up an integrated network of events, and in turn lead to the end objective of an operational system.

There are three factors that influence progress in executing a project using the system: (1) time, (2) resources, and (3) technical performance. Time is the variable that can be used as a common denominator to reflect planned resource application and performance specifications.

This technique allows management to simulate the effect of alternate decisions under consideration and to study their effects upon project deadlines prior to implementation.

This section monitored the activities necessary to prepare plans and specifications for 66 Interstate projects, 29 primary projects, 83 secondary and urban projects, 12 state maintenance projects, and 5 capital improvements. During the past year this section monitored 6 contracts for the Construction Division and resident engineers. The Highway Department now requires each successful bidder on all projects to submit a schedule of activities in network form, which will be processed through this section.

SECTION III

Equipment

Materials and Testing

Communications

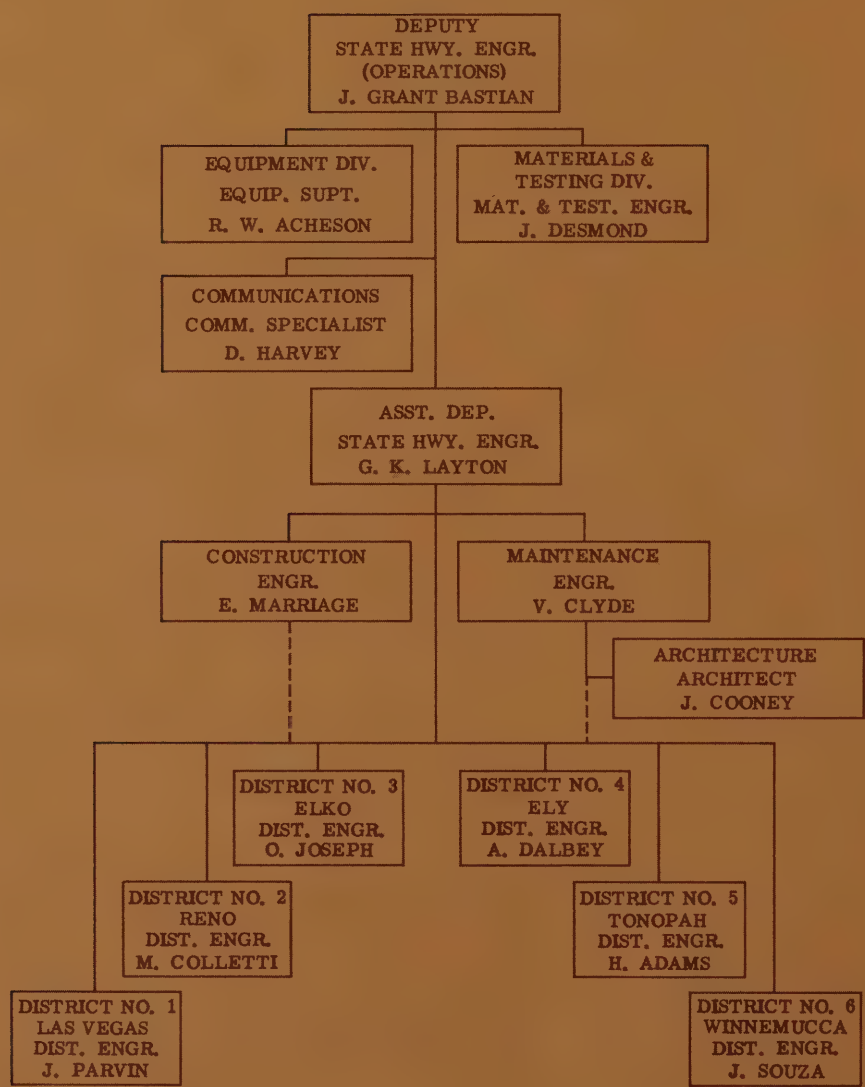
Construction

Maintenance

Architecture

District Operations

SECTION III


DEPUTY
STATE HWY. ENGR.
(OPERATIONS)
J. GRANT BASTIAN
EQUIPMENT DIV.
EQUIP. SUPT.
R. W. ACHESON
MATERIALS &
TESTING DIV.
MAT. & TEST. ENGR.
J. DESMOND
COMMUNICATIONS
COMM. SPECIALIST
D. HARVEY
ASST. DEP.
STATE HWY. ENGR.
G. K. LAYTON
CONSTRUCTION
ENGR.
E. MARRIAGE
MAINTENANCE
ENGR.
V. CLYDE
ARCHITECTURE
ARCHITECT
J. COONEY
DISTRICT NO. 3
ELKO
DIST. ENGR.
O. JOSEPH
DISTRICT NO. 4
ELY
DIST. ENGR.
A. DALBEY
DISTRICT NO. 2
RENO
DIST. ENGR.
M. COLLETTI
DISTRICT NO. 5
TONOPAH
DIST. ENGR.
H. ADAMS
DISTRICT NO. 1
LAS VEGAS
DIST. ENGR.
J. PARVIN
DISTRICT NO. 6
WINNEMUCCA
DIST. ENGR.
J. SOUZA

The Deputy State Highway Engineer, Operations, is responsible in a staff capacity, for assisting and advising the State Highway Engineer in the administration of the Equipment, Materials and Testing, Communications, Construction, Maintenance, and Architecture divisions, and District Operations of the Department.

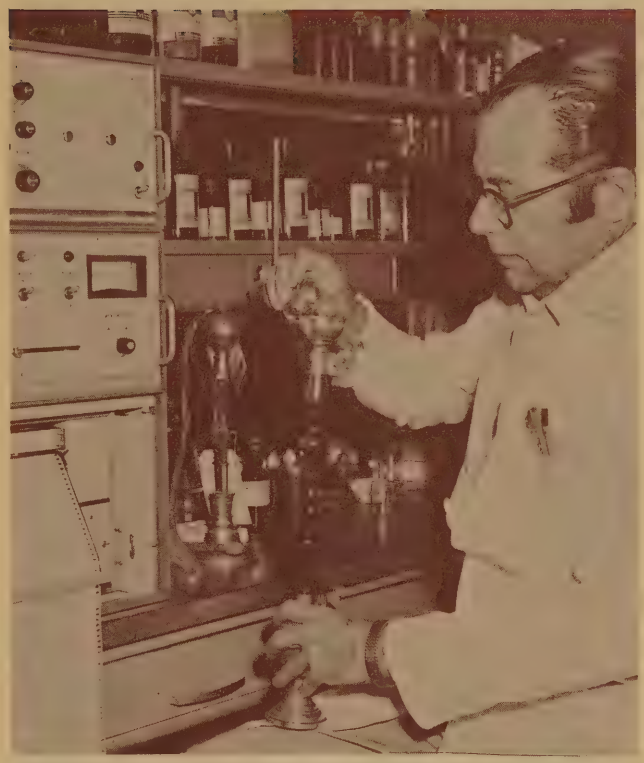
EQUIPMENT

During fiscal years 1969–70, the Equipment Division continued to seek ways and means of increasing operating efficiency and economy of operations. During the biennium this division completed a program of converting to full hydraulically operated sanders in snow removal units; sponsored operator and mechanic training classes given by the equipment manufacturer; made automatic transmissions standard equipment on trucks for safer and easier operation; fabricated three new types of gravel screening plants that resulted in savings of approximately 40 percent in the cost of gravel; inaugurated a more realistic equipment retirement program; and initiated a program to upgrade equipment accounting to obtain more accurate cost data on repairs and operations.

The Equipment Division's budget for fiscal year 1969 was $3,647,480 with 154 employees, and $3,936,744 for fiscal year 1970 with 158 employees.

The fleet inventory totaled 1,765 units during the biennium.

The equipment division initiated a more realistic equipment retirement program, as well as a program to upgrade equipment accounting to obtain more accurate cost data on repairs and operations.



In addition to its normal functions, the materials and testing division conducted several hundred tests for law enforcement agencies throughout the northern half of the state. Over 90 percent of the work involved narcotics or dangerous drugs.

MATERIALS AND TESTING

In addition to its normal functions of coordination, acceptance, and control of the materials used in the design, construction, and maintenance of highways, this division works closely with the Construction, Design, Bridge, and Right-of-Way divisions, as well as with outside agencies in both a service and advisory capacity.

During the reporting period, this division performed a total of 132,442 tests on materials submitted for examination. Materials tested included structural steel, concrete, soils, riprap rock, colored asphalt, asphaltic cores, and field investigations of failing concrete for outside agencies.

Although this division was geared more towards testing materials relative to highway activities than it was to chemically analyze substances in pills and powders and determine their effect upon the human body, a substantial number of tests were conducted for law enforcement agencies on drugs and narcotics such as marijuana, amphetamines, and others during the biennium.

In addition, research was conducted in the fields of skid testing, use of different types of sealant materials, dust pallatives, and the reflective ability of paints and traffic markers.

The addition of new equipment, and the installation of several new mobile repeater sites, provided many more miles of mobile radio communications service for the Department.

COMMUNICATIONS

During the last 2 years new mobile repeater sites were developed at Toulon Peak, Austin Mountain, Prospect Peak, Highland Peak, Mount Moses, and Beaver Dam. New active mobile repeaters, which added many more miles of mobile radio communication service, became operational at Austin Mountain, Prospect Peak, and Highland Peak. Right of access for Winnemucca Mountain, Mary's Mountain, and Apex was initiated and these stations should be on the air in 1971.

All multichannel equipment to connect Toulon Peak, Mount Moses, Austin Mountain, Prospect Peak, Cave Mountain, and Highland Peak was installed. Thirty high and low band mobile radios were procured and adapted for use in vehicles by Highway headquarters and district personnel. Necessary equipment was ordered to establish a pilot demonstration of long range mobile service in District 4 designed to allow executive mobiles to communicate with other widely separated units. The dispatcher in District 4 also will have this capability. Equipment procurement was initiated for extension of this system to District 3.

The Communications Division developed cooperative agreements with commercial television broadcast companies to permit TV Channel 2, Reno, broadcasts to be transmitted via highway sites through Winnemucca to Elko for rebroadcast. Similarly, arrangements were made to provide for Channel 3, Las Vegas, to be transmitted through the Pioche, Eureka, Austin, Ely, and Elko areas, and for Channel 8, Reno, to be transmitted from Austin to Eureka to Ely to Elko. The Humboldt, Lander, Pershing, Carlin, Elko, White Pine, and Eureka television districts also are cooperating with the Department in use of highway mountain top facilities.

The anticipated move of the centralized computer facility from Highway headquarters to its own building will involve electronic connection from the Highway building to the new facility. This division currently is cooperating with traffic engineering in design and construction of a cable facility which will service both the Department of Highways and the Department of Motor Vehicles.

A 2½ mile powerline was nearly completed, utilizing surplus poles furnished by the Equipment Division and wire obtained from surplus.

Communications rooms for the Ely and Elko offices were designed and slated for operation in the spring of 1971.

Road reporting is a service provided by the Department during the winter months. Normally this part time position is filled by University of Nevada students and provides up-to-date reports on road conditions to the concerned motorist.

CONSTRUCTION

During the biennium the Construction Division continued its policy of increased control and responsibility at the district and project levels, which alleviated many problem areas.

The division's headquarters staff was increased with the assignment of an employee to coordinate the equal employment opportunity programs and assist in labor compliance. The number of field personnel in the division averaged 305 employees during the 2 year period. Approximately 65 of these employees were construction aids and engineering student aids employed during the summer months. In addition, the division assigned a computer programmer to be responsible for providing the necessary computer technology relative to construction projects on a statewide basis.

Permanent duty stations were established for field employees and complete operation of the system now is in effect, and working well. This method of operation provided the field employee the opportunity to establish a permanent residence and become more involved in community affairs.

A different approach to paving was taken on a 13.5 mile Interstate project near Winnemucca begun as the biennium closed. Nuclear testing devices will be used and thick lifts of plantmix base and surfacing will be laid using a string line, in an effort to improve riding quality. Automatic controls will be utilized on finishing gravel courses and plantmix paving contracts for the same purpose.

Grading work on a relocated portion of U.S. 395 between Reno and Carson City nears completion. This beautiful new freeway was completed shortly after the close of the biennium.

Maintenance costs continued their upward spiral showing expenditures in excess of $15.3 million. Costs for snow removal totaled $752,691.

MAINTENANCE

Maintenance operations during the biennium were comparatively normal during the long, hard winter of 1968–69 and the mild winter of 1969–70. However, maintenance costs continued their upward spiral, showing expenditures in excess of $15.3 million during the reporting period. As a result of the mild winter during 1969–70, the increase was much smaller than anticipated. Landscaping and rest area care reflected a considerable increase in maintenance costs, and required additional increases in manpower. The overall general maintenance program was accelerated in litter cleanup, landscaping, comfort stations, signing, traffic marking, and safety projects.

Additions and betterments were an ever-increasing item because of age and traffic loads on the older primary and secondary roads. In excess of $1 million in additions and betterments was programmed and constructed annually. This work represented from 15 percent to 20 percent of the maintenance budget and totaled in excess of $2.5 million during the biennium.

Contract maintenance became an increasingly important segment of the maintenance program. These projects were constructed using 100 percent state funds, to handle needed improvements, in excess of federal funds available for reconstruction.

The supervisory training program was continued, with Maintenance Academy sessions scheduled at semi-annual periods. When all maintenance superintendents, supervisors, and foremen have completed the instruc-

Litter pickup keeps maintenance personnel busy during the summer months. It is costing the state in excess of $290,000 per year to keep Nevada clean.

tion, the program will be continued to train new foremen and for refresher courses. In addition, instructional schools for Allison automatic transmissions, traffic striping, and blasting were conducted in conjunction with the training and safety sections and with assistance from the Equipment Division.

The cooperative fencing program was continued during the biennium. Costs for fencing the right-of-way through problem areas where cattle and horses became a major hazard, were shared by the Department, the Bureau of Land Management and adjoining ranchers. Forty-five miles of two party, and 146 miles of three party, cooperative fencing were constructed during the 2 year period.

Acts of vandalism are a major concern of the Department. Costs for repair and/or replacement of signing continue to rise.

ARCHITECTURE

The Architectural Division was responsible for the preparation of plans, specifications, and contract documents for the construction of Department-owned buildings of many types including garage and repair shop structures, buildings for vehicle and equipment storage, residences and office buildings, motor fuel storage and dispensing facilities, water supply, sewage disposal and electrical systems. In addition, a continuing program of repairs, remodeling and modernizing older facilities was carried out.

The division also was responsible for inspecting projects during construction, and administering contracts, including record-keeping, reports, change orders and arranging payments to contractors.

One of the new five-man maintenance stations completed during the biennium is located at Cold Springs on U.S. 50 in Churchill County.

During the biennium, new maintenance buildings were designed and built at Elko, Wells, and Carlin. At Elko an equipment storage building, a testing laboratory building and an addition to the district office were completed; a new vehicle storage garage and motor fuel depot were completed at the Wells maintenance station; a new vehicle storage building was completed at the Battle Mountain maintenance station; new five-man stations were completed at Emigrant Pass on Interstate 80 in Eureka County, and at Cold Springs, on U.S. 50 in Churchill County; major repairs and improvements were completed at the Eureka maintenance station; a new addition to the headquarters materials and testing laboratory was completed at Carson City; plans were completed for storage buildings at Carson City, Reno and Virginia City maintenance yards; new storage facili-

ties and office space for maintenance supervisors and foremen were completed at District 5 Headquarters in Tonopah; a new two-man station was constructed at Charleston Park on State Route 39 in Clark County; and at District 1 Headquarters, Las Vegas, a large new addition to the administration office building was constructed and the existing building modernized and redecorated.

Plans were completed and informal contracts let for numerous repair and remodeling projects, which included roofing, heating systems, electrical systems, and enlargement of existing buildings. As the biennium closed, plans were underway for new storage facilities at the Wellington maintenance station and for enlarging and modernizing the Spooner Summit maintenance station.

DISTRICT OPERATIONS

A review of construction and maintenance activities in the Department's 6 engineering districts during the biennium reveals that 191.75 miles of roadways were built at a cost of nearly $36.5 million.

Construction work progressed smoothly on one of the massive interchanges for the Downtown Expressway in Las Vegas.

The graceful Bellevue Bridge is shown spanning U.S. 395 in the Washoe Valley near Carson City.

- District 1—Construction activity in this district shows that 61.7 miles of highway were built at a cost of $11.3 million, including 36.4 miles of Interstate, 16.8 miles of primary, and 8.5 miles on the secondary system. The Mount Charleston maintenance station, located on the north side of S.R. 39, approximately 15 miles west of the junction with U.S. 95, was completed at a cost of $159,042. The dual safety-rest facility, on Interstate 15 approximately 5 miles north of the Nevada-California state line, which was started during the previous biennium, was completed. Crossovers with storage lanes were constructed on the Boulder Highway and on Oakey Avenue and a left-turn storage lane for southbound traffic was constructed at Boulder Highway and Dalhart Street. Signals and channelization were constructed at Boulder Highway and Nellis Boulevard, and channelization completed at Water Street and Boulder Highway in Henderson. A maintenance safety project of flattening slopes, extending culverts, etc. was started along the Boulder Highway. Median islands on the Tonopah Highway (U.S. 95) were paved and color coated from Bonanza Road to Sunset Road. Approximately 16 miles of fencing was constructed in cooperative agreement with the Bureau of Land Management along U.S. 93 in the Alamo area.

- District 2—Construction was completed on 6.4 miles of Interstate, 24.3 miles of primary and 1.4 miles of the

secondaries during the biennium at a cost of $7.5 million. A new maintenance station was constructed at Fernley and a safety rest was completed at Carson City. Curbs and gutters were improved at Virginia City. Deck repair of the Nixon Bridge was completed and riprap was installed on S.R. 88.

Shown is the type of paver used for fine grading of compacted base on I–80 between Emigrant Pass and Carlin.

• District 3—A new district engineer was appointed. Projects totaling $10.3 million were completed during the biennium which included 18.3 miles of Interstate, 10.4 miles of primary, and 16 miles of secondary highways. The Emigrant Pass maintenance station was completed at a cost of $231,062. A new stockroom was added to the Elko District Office, in addition to remodeling the maintenance building and fencing and paving the yard at a total cost of $117,676. Cooperative fencing agreements with ranchers were completed at a cost of $3,636.

Road life is extended considerably by such maintenance activities as sealing and sanding as shown here on U.S. 50 west of Ely.

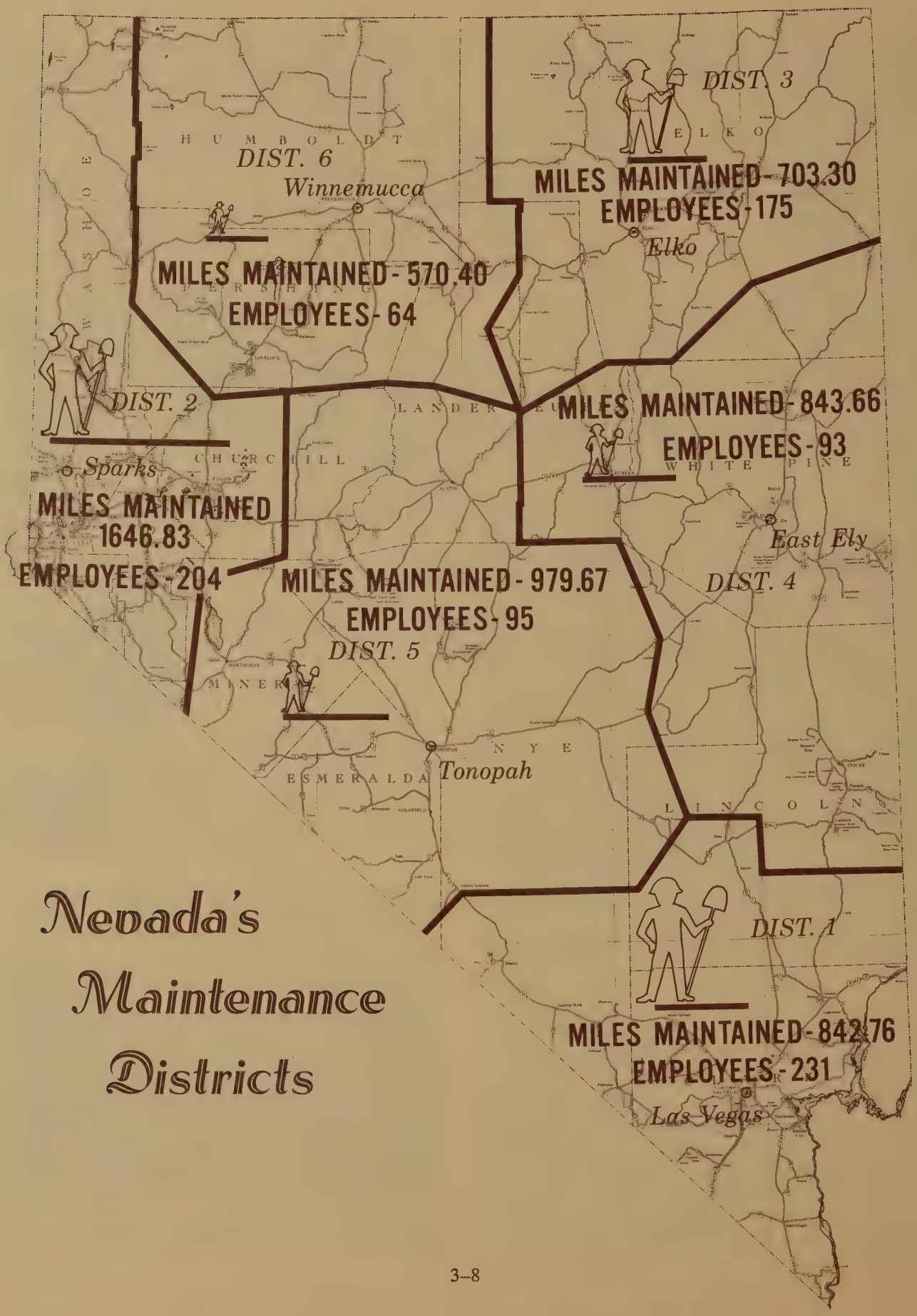
• District 4—Nearly 17 miles of primary and secondary roadway were completed during the biennium, involving contracts costing $768,118. Repairs and improvements to the Eureka maintenance station were completed and a comfort station constructed on U.S. 50 near the southern city limits of Eureka. Water was provided the roadside rest located 4 miles east of the Lander county line on U.S. 50 through the joint efforts of the Bureau of Land Management and the Department. As part of the highway safety program, a deceleration lane and rest area embankment were constructed for the Eureka comfort station, lighting was installed at the East Ely overpass, and the roadway was widened on U.S. 50, 5 miles west of Ely. Improvement was made to East Ely overpass approach ramps, and the overpass wooden guardrails were replaced with steel. Maintenance forces completed 24.8 miles of fencing, upgraded an additional 21.6 miles of fence, installed two new drop inlets and modified two others, as well as placing an 18 inch C.M.P. at McGill to improve drainage and reduce flood conditions.

Typical of the hot plants used by contractors is this one in operation near Tonopah.

• District 5—A new district engineer as well as a new assistant district engineer were appointed during the biennium. Two miles of primary highway were opened to traffic at a cost of $133,752. Completed too, were the maintenance station at Cold Springs, and the Tonopah maintenance office and vehicle storage sheds. About 19 miles of fencing were constructed between Tonopah and Goldfield under a cooperative program with the Bureau of Land Management. Two curves were improved and repaved at Redlick Summit as a safety project.

The Button Point rest area is one of several such areas located throughout the state to provide the motoring public with complete facilities, including rest rooms, tables, grills, and discharge storage tanks for campers.

• District 6—At a cost of $6.5 million, 33.19 miles of roadway were completed and opened to traffic during the biennium. This included 23.7 miles of Interstate, less than a mile of primary, and 9.4 miles on the secondary system. A vehicle storage building was completed at the Battle Mountain maintenance station and rest areas were constructed at Button Point and Cosgrave for $137,625 and $143,295, respectively. Rest rooms were completed at the rest area 2 miles south of Orovada and at Golconda Summit for a cost of $4,600. Other maintenance projects completed during the reporting period included cooperative fencing agreements with Bureau of Land Management on S.R. 140 and U.S. 95 at a cost of $17,170; maintenance station improvements for $10,000; beautification of overpass ramps for $1,300; erection of an antenna tower; and installation of a power van and generators at the Toulon Radio Site for $2,700. Maintenance damage and drainage improvements on U.S. 40 were completed for $4,000 and $168,440, respectively. A landscape crew (foreman and three maintainers), and a vocational education and equipment operator instructor were added to the district staff during the biennium. Pavement safety improvements were completed at a cost of $30,933 and the Lovelock crossover railroad signals were installed for $40,113. Traffic signals were installed in Battle Mountain for $11,462.


DIST. 6
Winnemucca
MILES MAINTAINED - 570.40
EMPLOYEES - 64
DIST. 3
MILES MAINTAINED - 703.30
EMPLOYEES - 175
Elko
DIST. 2
Sparks
MILES MAINTAINED
1646.83
EMPLOYEES - 204
MILES MAINTAINED - 843.66
EMPLOYEES - 93
East Ely
DIST. 4
MILES MAINTAINED - 979.67
EMPLOYEES - 95
DIST. 5
Tonopah
DIST. 1
MILES MAINTAINED - 842.76
EMPLOYEES - 231
Las Vegas
Nevada's
Maintenance
Districts

SECTION IV

Federal Aid Programs

Location

Right of Way

Utilities

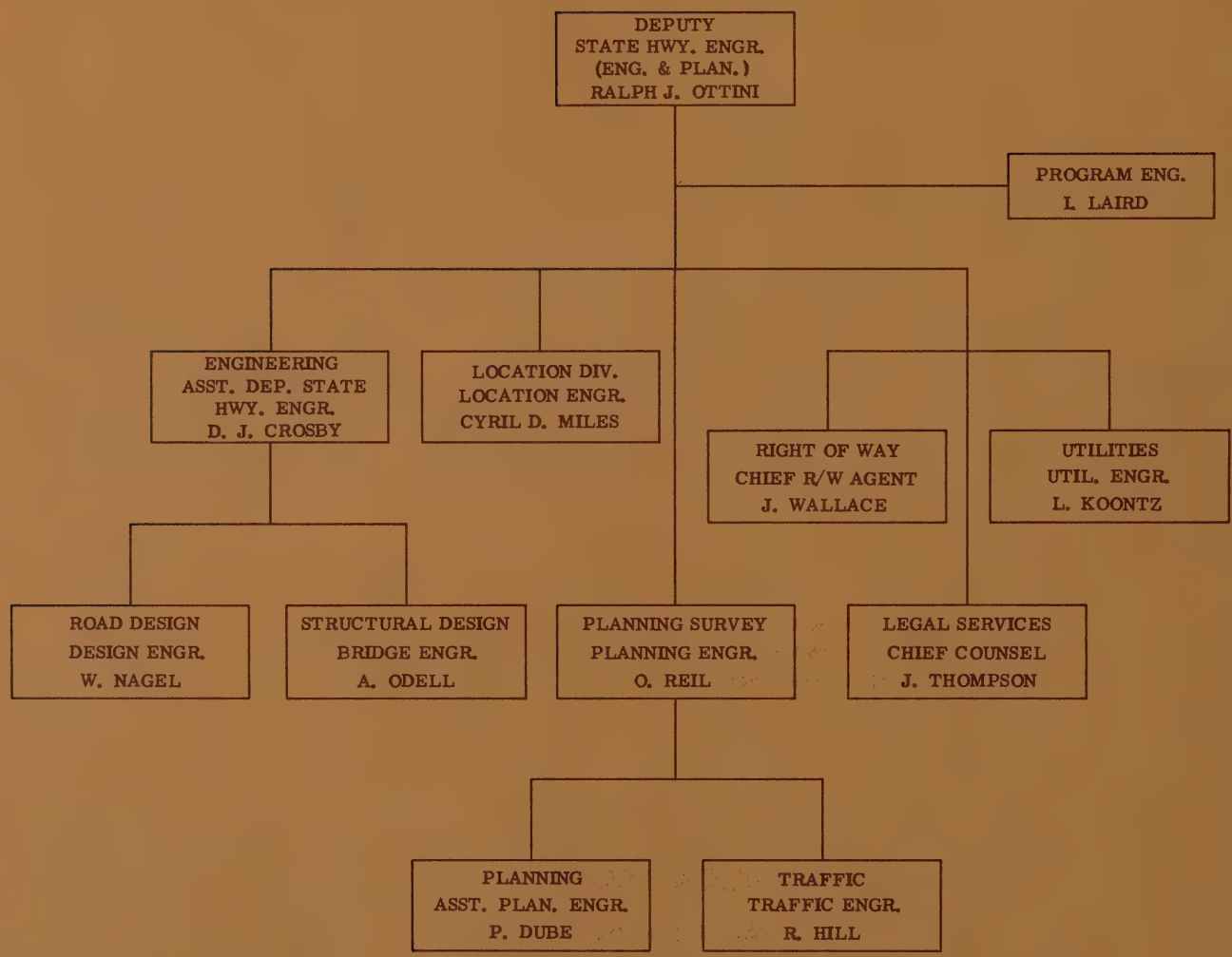
Road Design

Structural Design

Planning Survey

Legal

SECTION IV


DEPUTY
STATE HWY. ENGR.
(ENG. & PLAN.)
RALPH J. OTTINI
PROGRAM ENG.
I. LAIRD
ENGINEERING
ASST. DEP. STATE
HWY. ENGR.
D. J. CROSBY
LOCATION DIV.
LOCATION ENGR.
CYRIL D. MILES
RIGHT OF WAY
CHIEF R/W AGENT
J. WALLACE
UTILITIES
UTIL. ENGR.
L. KOONTZ
ROAD DESIGN
DESIGN ENGR.
W. NAGEL
STRUCTURAL DESIGN
BRIDGE ENGR.
A. ODELL
PLANNING SURVEY
PLANNING ENGR.
O. REIL
LEGAL SERVICES
CHIEF COUNSEL
J. THOMPSON
PLANNING
ASST. PLAN. ENGR.
P. DUBE
TRAFFIC
TRAFFIC ENGR.
R. HILL

The Deputy State Highway Engineer, Planning and Engineering, is responsible in a staff capacity, for assisting and advising the State Highway Engineer in administration of the Federal-aid Programs, Location, Right-of-Way, Utilities, Road Design, Structural Design, Planning Survey, and Legal divisions of the Department.

FEDERAL–AID PROGRAMS

This division prepares and submits to the U.S. Department of Transportation detailed programs of proposed projects for the utilization of apportionments for each class of federal funds. The programs cover preliminary engineering, right-of-way, and construction, and are the initial commitment on the part of the U.S. Department of Transportation to participate in the proposed projects.

During the biennium, Congress added three additional classes of federal-aid funds and a special right-of-way revolving fund to the federal-aid highway program. There now are eight classes of federal-aid funds available to the State for programming, which include: Interstate, Primary, Rural Primary, Secondary, Rural Secondary, Urban, TOPICS, and Highway Planning and Research. In addition, the state is allocated funds for control of junkyards, landscaping, and scenic enhancement under the highway beautification program. The state also was allocated federal lands highway funds for use on two specific projects during the biennium.

There were $61,859,325 of federal-aid funds, $207,-222 of right-of-way revolving funds, $139,056 of beautification funds and $2,000,000 of federal lands highway funds available for obligation.

During the biennium this section submitted 170 federal-aid programs, 77 in fiscal year 1969 and 93 in fiscal year 1970; 2 right-of-way revolving programs, both in fiscal year 1970; 5 beautification programs, 4 in fiscal year 1969 and 1 in fiscal year 1970; and 2 federal lands programs, 1 in each fiscal year. The programs obligated $61,859,325 of federal-aid funds, $24,026,-831 in fiscal year 1969 and $37,832,494 in fiscal year 1970; the entire $207,222 of right-of-way revolving funds in fiscal year 1970; $132,761 of beautification funds, all in fiscal year 1970; and the entire $2,000,000 of federal lands highway funds, $1,300,000 in fiscal year 1969 and $700,000 in fiscal year 1970.

The number of program submittals in the biennium increased approximately 20 percent over the previous biennium. During this reporting period, the programs section prepared and submitted to the U.S. Department of Transportation three requests for allocation of federal lands highway funds and a special request for allocation of additional Interstate system mileage.

The passage of Public Law 90–577, the Intergovernmental Cooperation Act, required this section to submit all proposed federal programs to appropriate state and metropolitan clearinghouses for review prior to submission to U.S. Department of Transportation. This requirement increased the amount of time and effort required for the preparation and submission of federal programs.

In the upcoming two fiscal years, the section will be concerned with developing and expanding the services to meet the increasing needs of the Department and expanding federal regulations.

There are three employees in the programs section which is an increase of one over the previous biennium.

Location assignments were often handled by construction survey crews.

LOCATION

During the biennium, the location engineer reported completion of 24.1 miles of ground location; 53.9 miles of aerials that were staked and checked on the ground; and surveys for 6 rest areas.

This work was accomplished in addition to that conducted on Interstate 80 and 15. A considerable amount of work was completed on these projects, including staking sections of alignment; line changes; right-of-way lines; utility lines; checking of topography; and in some cases, extending work beyond aerial coverage.

A significant amount of location work was accomplished in the districts during the past 2 years and included running pilot lines; fence line; locating and staking material sites, especially in District 4; stake out of maintenance buildings and other items for construction or improvement by district forces.

In addition to the work accomplished by the Department's two location survey crews, location assignments were handled by construction survey crews when they were available.

RIGHT–OF–WAY

The Right-of-Way Division is responsible for acquiring all property and property rights necessary for construction of highways. This may also include access rights, maintenance station sites, material sites, radio tower sites, roadside rests, beautification and scenic easements. All purchases must be equitable and fair to both the individual owner and to the taxpayers of the state. To accomplish this, the division works within a complex framework of state and federal laws and regulations.

During initial study and design of a proposed project, right-of-way personnel work closely with the Location and Design Divisions to determine how the properties to be traversed will be affected. Determination of ownership, preparation of property maps, land descriptions, appraisal reports, agreements, deeds and other documents must be completed for each individual property before the right-of-way agent can begin negotiations with the owner. In the majority of cases, negotiations are concluded to the satisfaction of both the property owner and the state. Only a small number of cases are referred to the Legal Division for possible condemnation, as most are settled before a trial is necessary.

Right-of-way engineering is the key to successful acquisition. In the majority of cases, negotiations were concluded to the satisfaction of both the property owner and the state without going to trial.

Under the present relocation assistance program, tenants and owners who must be relocated because of right-of-way acquisitions, are provided with information and assistance in locating a new residence, farm, or business, as the case may be. Relocation payments are for the total cost of moving. Included in the owner-occupant cases are replacement housing payments up to $5,000.

Property management is an activity that encompasses such activities as leasing homes, apartments, or businesses during the interim between purchase of the property and advertising for the construction contract, and clearing the land of improvements by public auction or demolition. Sale of excess property is handled by the property management section.

For the first time in its history, the Highway Department held a public auction for leasing three parcels of land under existing bridge structures in Las Vegas. One parcel was under the Downtown Expressway west of Main Street; and the other two under the Sahara Avenue overpass on the east and west sides of the Union Pacific Railroad tracks. Revenue to the state from these parcels will approximate $10,000 per year.

To insure that property owners affected by the highway projects are kept fully informed, the Right-of-Way Division utilizes various means of communication; i.e., the mass news media, personal letters, public meetings, personal contact and distribution of brochures.

During the biennium, the Right-of-Way Division continued to initiate programs and procedures to assure compliance with state and federal regulations.

The Market Sales Data Bank is a cooperative effort between the Department, title companies, lending institutions, and other agencies concerned with property transactions. Current information on property sold, including type of construction, zoning, and other pertinent information is recorded on a data processing printout sheet. These reports save hundreds of man hours and provide up-to-date, accurate information for use in preparing appraisal reports.

Two full-time data processing programmers were assigned to this division during the past biennium, increasing the total of personnel to 69. In addition, data automation was utilized to prepare a complete inventory of all acquisitions, which in conjunction with a microfilm filing system provided the three-fold benefit of security, rapid file retrieval, and maximum use of available filing space.

Right-of-way personnel participated in supervisory and management training programs as well as continu-

ing education programs in the technical fields of engineering, appraising and negotiating. A revised right-of-way manual and several instructional booklets were published during this period, and contributed to the over-all goal of maintaining a competent and well-trained organization.

Right-of-way acquisitions for this biennial totaled 235 parcels containing 2,751.885 acres of land at a cost of $11,279,474.84.

UTILITIES

The Utility Division is responsible for utility-railroad adjustments, revocable permit processing, utility inspection, beautification coordination, utility service agreements, and division office engineering. The division operates from the central headquarters with field offices in Elko, Las Vegas, Reno, and Winnemucca and is staffed by 22 employees. The complexity of utility and railroad adjustments, together with the establishment of new accommodation policies, has increased demands on the division.

The division completely revised the Department of Highways' *Policy for the Accommodation of Utilities on State and Federally-aided Highways within the State of Nevada* to conform with applicable provisions of Title 23, Code of Federal Regulations and U.S. Department of Transportation, Policy and Procedure Memorandum 30–4.1.

The accommodation policy also contains a section that establishes procedures for the processing and issuance of occupancy permits for utilities occupying highway rights-of-way.

State and federal laws provide for reimbursement to property holders for utility relocations when evidenced by a prior right of occupancy, or when not covered by a state revocable permit. The cost of the relocation is considered reimbursable after deducting all increases in value of the relocated facility. Any betterment or increase in the useful service life of relocated facilities must be borne by the company to insure that taxpayers' dollars do not participate in any enhancement to facilities belonging to a profit-making, private enterprise. When a utility is forced to move its facilities to accommodate public improvement, it is entitled to be left in the same relative condition it enjoyed prior to the improvement. There is an obligation to make the utility "whole," no more, no less.

In order to assure strict compliance with all regulations, and discharge Department responsibility to the taxpaying public, it is imperative that control be maintained over a project from its inception to conclusion and final payment.

In this respect, the Utility Division maintains construction inspection, assists in internal auditing, and carefully documents all aspects of the transaction to insure the full measure of federal participation. During the biennium, utility and railroad adjustments amounted to approximately $2 million.

It is the responsibility of this division to clear newly acquired right-of-way of outdoor advertising structures prior to the letting of a project, thereby providing the contractor with an unobstructed working area. This is accomplished by a sign survey, whereby each outdoor advertising structure is assigned a number, photographed, plotted on right-of-way or construction plans, and the size, type, and ownership noted. The owner of each sign then is notified by letter of the necessity to relocate the affected structure. Compliance with certain stipulations will allow the Department of Highways to make reimbursement for expenses incurred through the required relocation. Upon receipt of the required docu-

Removal or installation of facilities for water, power, telephones and drainage can be a major portion of any given project.

mentation, along with verification from the utility inspector that the relocation has been completed, a request for a warrant is forwarded to the Accounting Division.

Due to the increasing number of railroad crossings, great emphasis was placed on coordination and negotiations with railroad companies throughout the state. The results simplified procedures, increased efficiency, and produced faster results. An excellent example of this is in the Las Vegas area where freeway structures will provide six new railroad crossings and eliminate three existing at-grade crossings. The Union Pacific Railroad, Clark County, North Las Vegas, and Las Vegas all are involved in the negotiations and costs for these improvements.

The division is participating in a milepost reference system to simplify filing, cost accounting and the description of geographical location.

This division developed fiscal control procedures to assure full federal participation. It is anticipated that activities will increase in all areas of endeavor, including additional responsibility in the beautification and scenic enhancement areas. In recognition of rapid expansion and necessity for constant improvement, the division embarked on a program of in-service and on-the-job training, as well as specialized instruction.

ROAD DESIGN

The Road Design Division is responsible for the preparation of all plans, estimates and specifications for construction, reconstruction and betterment projects let to contract. To accomplish the preparation of plans, estimates and specifications for a project, it is necessary to coordinate design activities with functions of other divisions within the Department and correlate data received. This includes traffic data; material information; right-of-way data; structure designs; and construction procedures, controls and methods.

The basic organizational structure of the division remained essentially the same during the biennium. The division continued to function with the two basic sections: Interstate Design, which includes urban design; and Primary-Secondary Design, which includes landscaping and rest areas. In addition, several specialized sections provided essential input into the overall design function. These sections included traffic design, hydrology and hydraulics, data processing, standard plans and manuals, drafting, and a plans check section. Experience during the biennium showed the organizational structure to be an effective work unit containing the degree of flexibility necessary to adapt to changing needs and priorities.

A relatively new aspect of the total highway facility, was the multiple-use and joint development of highway right-of-way and adjoining parcels.

During the biennium, there were 78 structures built or put under construction at a cost of $9.4 million. One of the newer structures is the pedestrian overpass on Oddie Blvd.

As of July 1, 1970, the division was operating with 103 permanent employees, compared to 93 on July 1, 1968. The increase is attributed to filling of essential positions that became vacant during the previous biennium as a result of normal attrition and the creation of a programming section. The work force was quite stable except for the lower positions where employee turnover was experienced. The development and recruitment of qualified draftsmen continued to be a problem.

As in the previous biennium, highway safety continued to be a major design consideration. In addition, pollution control and environmental problems emerged as all important considerations and promised to become a whole new field of endeavor. Another relatively new aspect of the total highway facility was multiple-use and joint development of highway right-of-way and adjoining parcels. These concepts offer a significant challenge to the design engineer who obviously must broaden his knowledge and abilities in order to cope with the ramifications of incorporating these factors into his work.

During the 1969–70 biennium, the division completed construction plans on 65 contracts which included 74 projects (18 Interstate, 17 primary, 12 secondary, 1 landscape, 6 rest areas, and 20 state) at a total construction cost of $50,136,000.

In conjunction with these contracts the division participated in the development of information for presentation at 12 public hearings, and continued with various stages of design work on projects programmed over the next 5 years.

STRUCTURAL DESIGN

During the biennium, this division was reorganized to include an assistant bridge engineer who was assigned responsibility for bridge construction and maintenance. In addition to enhancing the overall efficiency of the division, this position provided for more stringent control over the maintenance of bridges. This primarily resulted from a Congressional directive issued after the disastrous collapse of a bridge at Point Pleasant, West Virginia.

This division included 1 bridge engineer, 2 assistant bridge engineers, 2 principal bridge engineers, 9 design engineers, 4 draftsmen, 4 in the foundation section, 1 computer programmer and 1 secretary for a total of 24 permanent employees.

The computer programmer in the division was utilized to keep the bridge program up-dated according to new computer technology and to work on new programs. Currently, there are 25 programs available for daily use.

During the past 2 years, structure locations changed considerably due to the addition and/or deletion of roads from the state system and the construction of new bridge structures. There were 78 structures built or put under construction, 25 more than in the previous biennium.

The cost of this construction was $9,702,613, an increase of $4,307,853 over the last reporting period. All except seven of these projects were for completely

new structures. The seven exceptions were made for increasing waterways or extending the width of existing structures. During the past 2 years, 34 structures were built on Interstate 80, 22 on Interstate 15, 18 on the primary system and 4 on the secondary system. Many completed designs had to be redesigned because of the safety and aesthetic regulations recently enacted. The safety regulations included more vertical and side clearance under structures, safer handrail features, cushion devices for car impact at center barriers, etc. Aesthetically, adjustments were made to present a more pleasing appearance of the structures.

The location and number of structures completed during the biennium were: Carson City (1); Clark (23); Douglas (3); Elko (8); Esmeralda (1); Lincoln (1); Lyon (1); Nye (1); Washoe (38); and White Pine (1).

The foundation section made complete studies on 20 structures during the last 2 years, and completed several special studies pertaining to buildings, wells, and retaining walls.

PLANNING SURVEY

The Planning Survey Division is responsible for the methods and procedures used for highway planning and research, including the assembly and analysis of planning data; administering statewide activities relating to urban planning and headquarters matters involving research relative to engineering, economics, and other aspects of highway planning, programming, design, construction, and maintenance.

During the biennium, activities falling under the cognizance of the Planning Survey Engineer included road inventory, cartography (mapping), reproduction, geodesy, planning data processing, photogrammetry, flight operations, traffic engineering, traffic, special studies, and urban transportation.

Inventory—Road Life

The third cycle of reinventory of the rural road system was in progress with the field crew being increased to two men during the biennium. Esmeralda and Mineral counties were completed and Elko County was in the process of being inventoried.

This continuing reinventory is required because rural roads under the jurisdiction of local governing agencies are constantly being improved, realigned, or shortened and, in some cases, abandoned through disuse. In addition, changing culture features, the extension of corporate limits, and the demand for more accurate maps are contributing factors to a continuous reinventory.

Street mileage increased in most cities during the biennium. The total street mileage increased from 880 miles in 1960 to 1,718 miles in 1969.

Streets of all incorporated and unincorporated cities and towns of 1,000 or more population were inventoried each year for mileage, width, and type.

The data from the inventory projects were coded for computer tabulation, and the results used in providing vehicle mile tabulations and data to other agencies.

The Sufficiency Rating Study, a survey of actual existing road conditions as compared to current design standards, is a continuing study on road deficiencies and inadequacies and provides a guide for construction priorities. The data obtained from this study contribute a great deal to the State Highway Department's preparation of a system of priorities for construction, reconstruction, and maintenance, based on actual physical needs. The study also provides legislative representatives and the general public with a clear understanding of the overall highway problem.

Each year the inventory section compiles and publishes logs on the federal-aid Interstate system, federal-aid primary system; federal-aid secondary system; nonfederal-aid state route system; U.S. routes and alternates; status of road systems; and the log of divided highways.

The third cycle of road reinventory was continued during the reporting period. Road logging is a continuous process that is necessary to keep abreast of changes in the systems as they occur.

Annually, the inventory section is responsible for the preparation of mileage and cost distribution tables, by county, on the federal-aid secondary system. This tabulation is used as a guide for the selection of federal-aid secondary routes and the reconstruction of existing secondary routes.

The Highway Needs Study, the Functional Classification Study, the placement of mile posts along the federal aid routes, the Scenic Route Study, Interstate Travelway Study, and other studies for the Department of Transportation were completed or, in some cases, continued.

Road life studies include the compiling and publishing of annual reports which are distributed to disseminate information on the status of state-interest roads, and include the control section index; the control section index maps; federal-aid secondary descriptions; and the state mileage tables.

The primary objective of road life during the biennium was to keep current records on the physical aspects and changes on all state-interest roads. This involved the compilation of factual data on length, width, surface type, year of construction, improvement and retirement records, and cost studies.

Street mileage increased in most cities during the biennium. Total street mileage has grown from 880 miles in 1960 to 1,718 miles in 1969.

Cartographic and Graphic Arts

The cartographic and graphic arts section continued its program of supplying map users with current maps of the State and its counties. In addition to its cartographic responsibilities, the section was called upon to supply the Highway Department, as well as other state agencies, with art work, typography, graphics, and visual aids.

The section was instrumental in developing new techniques in graphic presentations and mapping, and was often consulted by other state agencies relating to problems in visual communications.

During this biennium, the section produced a varied assortment of maps and related material, which included: Completely revised maps for Pershing, Lyon and Churchill counties; 7 quadrangle maps covering sections of Lyon County; and completely revised city maps for Lovelock, Yerington and Fallon. Because of county line changes passed by the Nevada Legislature, the county maps of Carson City, Douglas, Eureka, Lander, Lyon and Washoe counties were partially revised. The section published a revised State Base Map for 1969 and 1970; published a revised detailed state map, 1970; published multicolored maps and graphic material for the Truckee Meadows and Las Vegas Valley Transportation studies; published traffic flow maps for Mineral and Elko counties, as well as for the cities of Hawthorne, Elko, Carlin and Wells; published the annual traffic report maps, including 2 traffic flow state maps for the years of 1969 and 1970; and traffic flow maps for Clark County. A total of 14 map sheets were completed. Cartography also prepared census maps for Las Vegas and Reno in cooperation with the U.S. Bureau of the Census; and prepared urban maps of Las Vegas and Reno, as well as maps for the TOPICS program in these areas.

At the present time the section is revising Esmeralda, Mineral and Elko county maps, which are in various stages of compilation, editing and research.

New regulations requiring public hearings for each new highway project increased the section's responsibilities in this area. The section developed new techniques in preparing maps, aerial photos and other material, so that the public would be more clearly informed of impending highway construction projects.

A new Highway Department seal was designed and constructed by this section. The new seal reflected the changing and dynamic growth of Nevada as influenced by modern transportation means.

Graphic arts and visual aids work showed a marked increase during the biennium. The section was called upon, with increasing frequency, to solve problems in the visual communications field for the Department.

The section began researching scribing, a new technique in cartography. Instead of using ink for drawing maps, a coated plastic sheet is engraved by special tools, which produces the final product in negative form. This method will be evaluated and tested for its adaptability to the Department's needs.

A geographic names directory for the State of Nevada was started, whereby every geographic name would be tabulated and pinpointed by coordinates. Using data processing equipment, the capability of publishing a listing of names in almost any conceivable combination, such as by county, type of feature, alphabet, etc., will be a reality. Using the directory and a map, any name within the state can be easily located. It will undoubtedly prove to be a valuable tool for geographers, governmental agencies, planners, and map users in general.

The cartographic and graphics arts section was called upon, with increasing frequency, to supply the Department and other state agencies with art work, typography, graphics, and visual aids.

Reproduction

Visual communication by graphic reproduction is one of the most widely used methods of transmitting information today. Rendering this service is an integral part of highway activities.

The reproduction section is called upon to do a great variety of tasks, with each requiring a different method of operation. The work stations involved in graphic reproduction are centralized in Department headquarters because the importance of visual communications is recognized as an essential service to management and requires a high level of technical knowledge and skill. The reproduction section provides services which include preparing copy, illustrating, photographing, press operating, collating, binding, and distribution.

As in the past, reproduction was called upon to handle the printing and photographing work of the many sections involved in highway design. The greatest majority of these requests emanated from the Roadway Design, Planning Survey and Right-of-Way divisions.

The functions of graphic reproduction continued to provide all necessary facilities for printing, aerial processes, reproducing photographs, maps and plans, offset operations and photo-drafting.

Reproduction continues to keep abreast of the tremendous advances in the graphic's field, and plans to enlarge with newer and more sophisticated equipment that will produce better results in the future.

Reproduction continues to provide in-house facilities for printing, offset operations, aerial processes, reproducing maps, plans, photographs, and photo-drafting.

Geodesy

During the biennium, the geodetic section accomplished several projects which included:

County mapping—established additional mapping control for Elko, Humboldt, and Lincoln counties.

Aerial mapping—basic control was completed for Aerial Survey Contracts 27 and 28, and all secondary control checked. Basic control was established for Aerial Survey Contract 29, but no mapping has been allocated at this time.

Location—additional work was accomplished in the Tahoe Basin, as well as a complete revision of basic

control to facilitate location work. Basic control on U.S. 395 south of Minden, the Reno area on the Ring Road, and miscellaneous small projects such as bearing checks, corner ties, and traverse computations were completed.

Files—the control data files were generally updated and information released upon request.

Statewide microwave study—radio station or microwave station sites were surveyed for the Highway Patrol as well as for the Highway Department.

Miscellaneous projects—control was worked on several county lines. Part of the data was required due to legislative action in redefining county lines. Positions on bridges throughout the state were listed by this section when needed. Many small general projects also were accomplished.

Planning Data Processing

This section, with a staff of four programmers and one analyst, is responsible for all applicable data processing activities involving the various sections of the Planning Survey Division.

As in the past, the vast majority of this section's work emanated from three sections—Special Studies, Traffic, and Urban Transportation. A partial list of the activities during the biennium included: truck weight studies; accident studies; speed studies; tourist studies; origin-destination studies; traffic studies; urban transportation studies for both the Truckee Meadows and Las Vegas Valley urban areas; and special one-time-only reports or studies on request.

Photogrammetry

During the biennium, two aerial topographic contracts were negotiated and completed; one in the Gabbs-Ione area and the other from near Gardnerville to the Nevada-California state line.

A substantial increase was noted in the number of aerial mosaics required during this biennium. The Right-of-Way Division used these aerials for both right-of-way parcel appraisals and court condemnation exhibits. These aerial mosaics played an important role in the court hearings, as well as in parcel appraisals.

Requests for public hearing mosaics more than doubled during the biennium. These aerials were used extensively by the design section for display at public hearings.

The traffic, special studies, and urban transportation sections also used aerial photography in their work.

It is anticipated that the use of aerial photography and topographic mapping will continue to increase throughout the Department in the coming biennium.

Flight Operations

During the biennium, a total of 478 hours was flown by Highway Department pilots in obtaining aerial photographs.

Aerial photographs taken by this section were used by the photogrammetry section to compile mosaics which play a major role in portraying proposed routing and alignment relative to property and terrain involved.

Since they were used for display purposes, requirements for aerial mosaics for public hearings more than doubled during the biennium.

Maximum use of the Department's Cessna 401 not only provided flight service for the Department, but to many other state agencies as well.

Location continued to use aerial photography in determining the most desirable route for a proposed highway.

Many hundreds of aerial pictures were used by the Design Division for the purpose of studying alignment, drainage, and topography. In many instances, vertical aerial photos were transferred to hard copy.

The Planning Survey Division used numerous high-altitude aerial photographs for map-making and establishing current street patterns in widely scattered communities.

Right-of-way was a big user of aerial photography. In addition to the use of vertical photography in the study of controversial property evaluations, it is important to note that the Right-of-Way Division continued to find an ever-increasing demand for aerial obliques. The oblique photographs were used in condemnation suits and proved their value in court on many occasions.

The Public Hearing Coordinator continued to use mosaics for informing the public of impending highway projects at public hearings.

During the biennium, the Department's Cessna 401 flew a total of 584 hours for personnel transportation. Approximately 128,000 miles were covered with a substantial savings realized in time and expense.

A vital responsibility of traffic engineering is the design and installation of safety devices. Contracts for highway lighting and traffic signal systems totaled $908,164 for the biennium.

Traffic Engineering

Traffic engineering is administered by the chief traffic engineer who is responsible for direction of the traffic, special studies, and urban transportation sections. The new federal-aid program called TOPICS (Traffic Operations Program to Increase Capacity and Safety), is carried out under his management. The traffic engineer assists the district engineers, resident engineers, maintenance engineers, and design engineers by reviewing plans pertaining to channelization, signing, signalization and lighting. His staff also is responsible for signal agreements, speed zones, and other traffic operations and planning matters related to state highways in the cities and counties of the state. In addition, traffic personnel often are called upon to speak at the Highway Maintenance Academy, Highway Patrol Academy and public hearings.

Contracts awarded for highway lighting and traffic signal systems during this biennium totaled $908,164.

Traffic

The job of maintaining, gathering, and projecting traffic data is the responsibility of the traffic section.

To insure that new highway construction is designed for the volume and type of traffic it will be called upon to carry; that maintenance is programmed to keep our highways travelable; that new routes are selected to serve the majority; and to help plan future land develop-

Traffic is counted 24 hours a day, 365 days a year, at 38 permanent traffic recorder sites located throughout the state.

ment to provide for orderly growth; it is necessary to monitor the number, type, and movement of vehicles that use our streets and highways.

Both mechanical and manual traffic counting are carried out by this section to provide current traffic statistics to the administrator, designer, planner, and the general public. There are 38 permanent traffic recorder sites located throughout the state where traffic is counted 24 hours a day, 365 days a year. These sites provide the hourly, daily, and monthly totals to help project short period counts (taken at approximately 1,800 sites on state-interest roads) to annual values. The permanent traffic stations also reveal historical trends which provides a base for the statistical projection of traffic needs for the future.

Manual classification of vehicles on some of the state-interest roads is conducted at predetermined locations. Manual counts provide the factors used to reduce machine total counts to vehicle types, as well as providing information on the movement of vehicles. In addition, these counts are used by the traffic engineer in designing traffic signals, geometric design of intersections, and maintaining traffic flow.

The state-interest road traffic data is further supplemented by year-long traffic inventories on county rural roads and city streets, taken at approximate 5-year intervals. During the past biennium, Clark and Washoe County inventories were updated, and an inventory begun of Humboldt and Pershing counties.

Annual reports compiled by the section during the biennium included the *Annual Traffic Report* with its recapitulations of traffic statistics, and the *Tabulation of Annual Traffic Census,* listing data for the month of July.

The section experienced a significant increase in the demand for specialized traffic data; such as traffic for design designations, traffic light warrant studies, the urban transportation studies, and the new highway functional classification and needs study.

Special Studies

Activity in all facets of the highway safety program intensified during the past 2 years. The special studies section developed a system for identifying accident location, and a coding manual for coding accident data for computer automation. In the near future, the Highway Department will have the potential for identifying sections of state-interest routes with a high accident history and an analysis program geared to pinpoint deficiencies for appropriate corrective action programs. Information on vehicle accidents is utilized for statewide safety improvements on system routes, the new TOPICS program, warrants for traffic signal installations, and the evaluation of the effectiveness of new safety devices. This information is vitally important in helping the Highway Department meet the requirements established by the National Highway Safety Bureau.

An upsurge was experienced in requests received for speed control zones in all parts of the state. New radar speed timers were used in field studies for accuracy and shortening the time necessary to obtain a reliable speed sample. Some of the more complicated studies included a complete speed control and signing plan for an entire area rather than one particular section of highway.

The section continued its participation in presenting a four-hour course in traffic engineering to new members of the Highway Patrol to familiarize them with operational characteristics of the constructed highway.

The past two years activity in urban transportation planning consisted of updating the count of occupied and unoccupied dwelling units in the two areas (Reno and Las Vegas) involved in the continuing urban transportation process, updating terminal (parking) facilities, and planning for new truck origin and destination studies.

Visitors to Nevada are interviewed to obtain information on traveling habits. Where motorists go, and why, is of vital importance to Department planning.

Geographic base files studies were completed in the Reno-Sparks and Las Vegas areas for the U.S. Bureau of the Census. It is hoped that results of the studies can be adapted for use in the continuing urban transportation process. In addition, origin and destination studies were conducted in the Pioche-Caliente, Lovelock and Winnemucca areas.

Personnel from this section continued to serve on several inter-departmental committees related to safety, economics and population forecasts. In addition, attendance at annual conferences of the Western Council for Travel Research was maintained. Participation in council activities was necessitated by the involvement of this section as an official outlet for information on Nevada's tourist industry.

Continuing, comprehensive, urban transportation studies are underway in both the Las Vegas and Reno/Sparks metropolitan areas.

The legislative waiver of sovereign immunity has resulted in an increasing number of tort suits against the Department for personal injury and property damage arising out of highway accidents.

Urban Transportation

The urban transportation section was established to develop cooperative, continuous, comprehensive transportation studies in the Truckee Meadows and Las Vegas Valley metropolitan areas of the state.

The initial phase of the Truckee Meadows urban transportation study was completed and recommended a complete transportation system to satisfactorily handle the anticipated traffic over the next 20 years. The first annual update was begun to ascertain if adequate progress was being made in the development of required facilities.

The Las Vegas Valley transportation study entered the final stages of system analysis on a series of three systems, which will supply the Las Vegas Valley with adequate transportation facilities until the area reaches a population of one million.

Both studies were based on projections of population growth and land use as developed by the local planning agencies.

The urban transportation section also is responsible for the Traffic Operation Program to Increase Capacity and Safety (TOPICS) in both urban areas. A series of intersections in both Truckee Meadows and the Las Vegas Valley were scheduled for improvement and complete detailed TOPICS studies were undertaken.

LEGAL SERVICES

The Chief Counsel is appointed by statute as the attorney and legal advisor for the Highway Department in all actions, proceedings, hearings, and all matters relating to the Department and to the powers and duties of its officers.

The Legal Division is involved in all aspects of the Department's operation, and frequently bears the final responsibility through its approval or disapproval of decisions which affect the Highway Department. Its personnel includes a chief counsel and several assistant counsels, legal researchers, a condemnation coordinator and a secretarial staff.

Since many actual work days may be lost by attorneys traveling to and from other counties where motions or other pleadings are being argued and trials heard, every effort is made to keep these trips to a minimum through use of a special deputy.

One of the primary functions of this division is the institution and trial of condemnation proceedings for the acquisition of rights-of-way.

Since the last report, the position of Condemnation Coordinator was added to the office staff. The Condemnation Coordinator develops information relative to the property sought to be condemned, including appraisals, records of negotiations, pertinent correspondence, as

well as all title information. The Condemnation Coordinator also works closely with attorneys in preparation of hearings and trials of condemnation actions in acquiring additional appraisals, plans, obtaining expert witnesses, obtaining additional title information, supervising preparation of trial exhibits, etc., and in this respect acts as a liaison between this division and other divisions of the Department.

The Chief Counsel is charged by statute with the responsibility of approving and endorsing all contracts, instruments and documents executed by the Department as to legality and form, as well as prosecuting claims against persons who have negligently damaged the Department's property.

In addition to suits on the State Highway Engineer's bond, the legislative waiver of sovereign immunity in 1965 has resulted in an ever-increasing number of tort suits against the Department for personal injury and property damage arising out of highway accidents.

An assistant counsel serves as chairman of the Contract Review Board, and in that capacity participates in the determination and recommendation of contractors' claims to the State Highway Engineer. Conferences are held with other members of the board, the resident engineer, and the contractor involved. All legal work required in subsequent litigation over contractors' claims is handled by this attorney. Approximately 24 contract claims were processed by the Contract Review Board during the biennium.

This office prepared prospective legislation for the Department, which was presented to the 1969 Session of the Nevada Legislature for its consideration. Many appearances were made by counsel before legislative committees in support of this legislation and other bills affecting the Department's interest and operations.

An index is maintained by this office on many written opinions that have been rendered previously by the Legal Division. This index makes it possible to predetermine if opinions have already been rendered on like matters, when a division requests advice or an opinion.

This office maintains an up-to-date library containing material on all aspects of law relative to Department operations, with particular emphasis on materials relating to eminent domain, contracts and torts. The state law library also is utilized in conjunction with the Department's law library.

SECTION V

Appendices

APPENDIX A

Administrative Services Office

TABLE 1

Job Authorization Data

District	Number of authorizations this biennium	Amount authorized this biennium	Amount authorized previously, expended this biennium	Amount expended and authorized this biennium	Total expenditures	Balance of work incomplete	
One	20	$567,500.00	$44,991.05	$234,016.99	$279,008.04	$288,491.96	
Two	74	821,110.00	16,137.75	545,015.18	561,152.93	259,957.07	
Three	32	417,119.00	51,029.67	245,068.28	296,097.95	121,021.05	
Four	31	414,553.00	234,145.51	215,176.04	449,321.55	34,768.55	O.D.
Five	27	417,700.00	173,883.70	226,428.47	400,312.17	17,387.83	
Six	47	443,270.00	138,135.11	191,261.59	329,396.70	113,873.30	
Totals	231	$3,081,252.00	$658,322.79	$1,656,966.55	$2,315,289.34	$765,962.66	

NOTE: Report covers Nos. 11274–11504, inclusive.

TABLE 2

Construction and Reconstruction Designated State Highway System

Type	Miles new construction completed during biennium	Miles reconstruction completed during biennium	Miles new construction under contract at close of biennium	Miles reconstruction under contract at close of biennium	Total
Plantmix	62.421	125.390	50.582[1]	85.501	323.894

[1]Includes 20.574 miles of concrete paving and 13.484 miles of grading for future surfacing.

TABLE 3

Contracts and Letting

77 Contracts and 47 Bid Openings

19 Interstate

11 Primary

11 Secondary

4 Urban

32 State

Amount of contract	No. contracts	No. bidders
Up to $50,000	12	34
$50,000 to $100,000	13[1]	48
$100,000 to $250,000	18[2]	62
$250,000 to $500,000	6	20
$500,000 to $1,000,000	16[3]	78
$1,000,000 to $1,500,000	1	13
$1,500,000 to $3,000,000	8	42
Over $3,000,000	3	11
	77	
	—6	
Contracts awarded	71	

308 bids submitted on 77 contracts

Average 4.0 bidders per contract

[1] 1 reject.
[2] 2 rejected.
[3] 2 rejected and 1 not awarded due to court action.

TABLE 4

Transportation Permits

	Number units moved
Heavy and highway	4,274
Farm machinery	520
Mobile homes[1]	7,609
Buildings	514
Military	272
Miscellaneous	3,636
Total	16,825

Transportation Permits Issued

July 1, 1968 thru December 31, 1968[2]	2,381
January 1, 1969 thru December 31, 1969[2]	4,178
January 1, 1970 thru June 30, 1970[2]	2,371
Total	8,930

Special Transportation Permits

(70 feet to 105 feet in length)

May 15, 1969 thru December 31, 1969[3]	48
January 1, 1970 thru June 30, 1970[3]	57
Total	105

[1]The Legislature of the State of Nevada in their 1965 Session amended NRS 484.600 related to "Maximum Width of Vehicles" allowing mobile homes in excess of 8 feet wide and not to exceed 12 feet wide to be moved on their own wheels, provided they meet the test set forth in the amended law which became effective July 1, 1965. The Department of Highways has been delegated the responsibility for issuing such permits, and from the guide lines set forth in the law, established the policy of issuing permits for the movement of mobile homes on a single trip or annual trip basis. A permit issued on an annual trip basis allows the permittee to transport a mobile home as many times as he wished under the authority of one permit. The effect of the law is reflected in the reduction of the total number of permits issued and not in the movement of mobile homes.

[2]A change in policy authorizes a permit to be issued for a period of 6 months, which allows the permittee to transport equipment as many times as he wished under the authority of one permit. The effect of change in policy is reflected in the reduction of the total number of permits issued and not in the movement of equipment.

[3]Approved by the Legislature of the State of Nevada in their 1969 Session.

TABLE 5

Encroachment Permits

	No. units issued
Telephone and telegraph lines	187
Television cable	8
Power lines	165
Service pipe—	
Gas lines	145
Water lines	153
Sewer lines	67
Culverts	11
Miscellaneous pipe	8
Approach roads and driveways	200
Miscellaneous	62
Grand total	1,006

TABLE 6

Prequalified Contractors

Rating	No. of contractors
$50,000 to $90,000	2
100,000 to 240,000	3
250,000 to 490,000	15
500,000 to 990,000	11
1,000,000 to 1,490,000	10
1,500,000 to 2,490,000	14
2,500,000 to 4,990,000	10
5,000,000 to 9,990,000	17
10,000,000 and over	44
Grand total	126

June 1968 there were 146 prequalified contractors.

June 1970 there were 126 prequalified contractors.

APPENDIX B

Industrial Relations—Personnel

TABLE 7

Employee Turnover by Classification[1]

Classifications	1967–68	1968–69	1969–70
General clerical—typists, account clerks, clerks	28	25	19
Stenographers	15	13	17
Supervisory clerical	0	6	1
Machine operators—key punch, bookkeeping, reproduction, etc.	10	5	9
Radio technicians	0	2	2
General stores	4	5	3
Professional Engineers—H.E., civil engineers, testing, design, etc.	13	10	8
Engineer technicians—E.A., draftsmen, inspectors, etc.	46	50	42
Planning survey technician	0	5	6
Accountant—auditor	1	3	4
Right-of-way and utility agents	3	3	5
Administrative	5	6	4
Highway maintenance—Maintainers, foremen, equipment operators, supervisors	41	55	63
Trades—Mechanics, painters, carpenters, etc.	10	8	11
Custodial and allied services	12	10	9
Totals	188	206	203
Total career positions	1,395	1,435	1,475
Turnover percentage	13.40	14.30	13.80

[1]Does not include temporary appointments or positions.

APPENDIX C

Accounting

TABLE 8

Operating Condition Statement

	FY 1969	FY 1970
Revenue—		
Federal aid	$28,575,225.00	$34,197,689.00
Users	17,865,476.82	20,097,677.47
Miscellaneous	1,077,995.59	1,289,295.08
Total revenue	$47,518,697.41	$55,584,661.55
Expense—		
Construction	$34,989,810.99	$38,807,033.34
Maintenance	6,669,381.67	6,741,415.32
Administration	5,005,566.81	6,427,219.70
Total expense	$46,664,759.47	$51,975,668.36
Gain for period	$853,937.94	$3,608,993.19

TABLE 9

Balance Sheet—Assets

	FY 1969	FY 1970
Cash—		
General	$13,643,736.11	$17,242,818.18
Revolving fund	37,604.14	23,731.63
	$13,681,340.25	$17,266,549.81
Receivables—		
Federal aid	$605,889.00	$812,342.00
Miscellaneous	156,453.38	95,994.45
Agreements	1,086,807.25	793,076.73
Users	.....	.....
Employee advances	14,672.70 CR	19,894.41 CR
	$1,834,476.93	$1,681,518.77
Inventory of materials and supplies—		
Equipment and maintenance	$831,317.84	$1,092,321.40
Headquarters	107,890.89	130,455.93
Work in process	836,082.97	943,294.51
	$1,775,291.70	$2,166,071.84
Land, buildings and improvements—		
Buildings	$6,497,260.00	$6,538,730.00
Land	25,807,401.31	28,197,711.32
Fleet	2,723,167.62	3,434,925.10
Office and shop equipment	1,069,550.42	1,437,659.48
	$36,097,379.35	$39,609,025.90
Investments and fixed assets—		
Highways completed	$415,059,431.23	$428,819,118.77
Highways in progress	16,169,653.93	18,086,882.16
	$431,229,085.16	$446,906,000.93
Total assets	$484,617,573.39	$507,629,167.25

TABLE 10

Balance Sheet—Liabilities and Surplus

	FY 1969	FY 1970
Liabilities—		
Contracts	$2,090,946.49	$2,436,526.76
Transfers	112,361.53	158,895.67
Vendors	277,780.75	37,650.69
Deductions	208,457.59	262,993.67
	$2,689,546.36	$2,896,066.79
Encumbrances—		
Contract retent	$1,319,233.74	$1,747,928.13
Balance to be earned by contractors	14,850,420.19	16,338,954.03
Nevada State Purchasing Department	973,872.00	1,396,529.24
Agreements	2,029,898.52	2,359,243.93
Engineering authorizations	3,629,345.26	6,859,309.12
	$22,802,769.71	$28,701,964.45
Proprietary—		
Reserve for investment in highways	$415,059,431.23	$428,819,118.77
Reserve for investment in other assets	37,906,500.39	41,808,927.08
Unappropriated surplus	$452,965,931.62	$470,628,045.85
Gain for period—July 1–June 30	$5,305,387.76	$1,794,096.97
Total liabilities and surplus	$853,937.94	$3,608,993.19
	$484,617,573.39	$507,629,167.25

TABLE 11

Working Capital Statement

	FY 1969	FY 1970
Current Assets—		
Highway fund cash	$13,643,736.11	$17,242,818.18
Revolving fund cash	500,000.00	500,000.00
Federal aid receivables	605,889.00	812,342.00
Miscellaneous receivables	156,453.38	95,994.45
User receivables	.....	.....
Total current assets	$14,906,078.49	$18,651,154.63
Current liabilities—		
Contracts payable	$2,090,946.49	$2,436,526.76
Transfers payable	112,361.53	158,895.67
Vendors payable	277,780.75	37,650.69
Deductions payable	208,457.59	262,993.67
Nevada state purchasing payable	973,872.00	1,396,529.24
Total current liabilities	—$3,663,418.36	—$4,292,596.03
Working capital as of June 30	$11,242,660.13	$14,358,558.60

TABLE 12

Status of State Highway Fund

Date	Receipts	Disbursements	Actual fund balance	Federal aid receivable	Estimated balance	Controller's balance
Fiscal Year 1969						
July 1968	$4,930,446.44	$4,445,675.61	$8,985,029.77	$3,057,396.00	$12,042,425.77	$9,421,829.99
August 1968	3,403,015.20	4,478,359.56	7,909,685.41	4,017,429.00	11,927,114.41	9,331,811.57
September 1968	4,993,955.25	3,375,439.20	9,528,201.46	2,678,460.00	12,206,661.46	10,604,210.81
October 1968	7,939,333.28	4,901,641.68	12,565,893.06	1,006,764.00	13,572,657.06	12,891,443.25
November 1968	1,008,091.44	3,364,839.96	10,209,144.54	4,927,454.00	15,136,598.54	10,451,407.76
December 1968	5,696,809.96	3,987,330.95	11,926,436.37	2,268,943.00	14,187,566.55	12,667,790.00
January 1969	1,315,225.49	4,245,697.02	8,995,964.74	603,283.00	9,599,247.74	9,282,413.07
February 1969	3,571,222.24	2,271,358.19	10,295,828.79	480,253.00	10,776,081.79	11,183,021.18
March 1969	5,277,281.19	2,903,194.71	12,669,915.27	883,010.00	13,552,925.27	13,475,205.71
April 1969	3,343,601.37	2,597,037.47	13,416,479.17	1,008,941.00	14,425,420.17	14,071,302.61
May 1969	3,612,318.84	3,947,712.32	13,081,085.69	719,578.00	13,800,663.69	13,485,060.10
June 1969	3,526,719.21	6,154,285.52	10,453,519.38	605,889.00	11,059,408.38	13,643,736.11
Fiscal Year 1970						
July 1969	2,593,867.85 CR	4,692,977.03	3,166,674.50	4,679,507.00	7,846,181.50	12,076,136.01
August 1969	6,297,049.91	5,652,312.23	3,811,412.18	4,070,098.00	7,881,510.18	12,471,134.82
September 1969	9,030,895.91	5,596,627.70	7,245,680.39	489,554.00	7,735,234.39	15,640,907.89
October 1969	4,031,396.43	4,573,474.75	6,703,602.07	4,131,157.00	10,834,759.07	10,368,355.47
November 1969	5,361,772.42	4,166,454.36	7,898,920.13	3,394,550.00	11,293,470.13	10,488,053.66
December 1969	4,501,930.92	3,955,183.94	8,445,667.11	144,427.34	8,590,094.45	11,135,608.47
January 1970	4,740,111.86	3,456,366.71	9,729,412.14	2,733,949.00	12,463,361.14	11,771,160.88
February 1970	4,906,924.88	3,286,615.84	11,349,721.18	2,304,130.00	13,653,806.68	10,673,105.89
March 1970	4,634,559.14	3,392,501.60	12,591,778.72	2,162,841.00	14,754,619.72	14,883,484.32
April 1970	5,445,019.28	5,094,240.03	12,942,557.97	687,501.00	13,630,058.97	13,194,665.45
May 1970	2,202,225.29	3,798,523.39	11,346,259.87	3,587,219.00	14,933,478.87	14,278,421.48
June 1970	6,816,527.75	4,310,390.66	13,852,396.96	812,342.00	14,664,738.96	17,239,958.33
Average monthly balance	$4,333,023.57	$4,110,343.35	$9,963,386.11	$2,143,944.80	$12,107,003.53	$12,280,426.03

TABLE 13

Historical Record of Receipts and Disbursements—1917–1970

Description	Fiscal Years 1917–1968	Fiscal Year 1969	Fiscal Year 1970	Total for biennium	Total Fiscal Years 1917–1970
Receipts—					
Fuel taxes	$170,642,261.61	$13,886,694.75	$15,180,320.30	$29,067,015.05	$199,709,276.66
Registration fees	37,425,837.35	4,005,327.56	4,849,238.09	8,854,565.65	46,280,403.00
Carrier fees	50,051,660.54	3,926,844.37	4,418,755.21	8,345,599.58	58,397,260.12
Driver's license fees	4,147,072.83	396,279.32	714,493.58	1,110,772.90	5,257,845.73
Sub-total	$262,266,832.33	$22,215,146.00	$25,162,807.18	$47,377,953.18	$309,644,785.51
Federal aid	374,743,547.12	29,770,895.00	33,991,236.00	63,762,131.00	438,505,678.12
Cities and counties	5,685,423.02	.....	.....	.....	5,685,423.02
Miscellaneous	11,839,831.43	981,648.09	1,285,632.47	2,267,280.56	14,107,111.99
Total receipts	$654,535,633.90	$52,967,689.09	$60,439,675.65	$113,407,364.74	$767,942,998.64
Expenses—					
Construction	$390,301,096.50	$25,993,926.14	$30,563,154.44	$56,557,080.58	$446,858,177.08
Maintenance	85,996,917.35	6,669,381.67	6,741,415.32	13,410,796.99	99,407,714.34
Surveys, plans, design and right-of-way	87,831,653.44	8,366,602.67	7,472,697.62	15,839,300.29	103,670,953.73
Administration	25,174,421.58	3,569,881.22	4,183,812.09	7,753,693.31	32,928,114.89
Equipment and plants	8,540,114.96	971,195.19	1,835,151.69	2,806,346.88	11,346,461.84
Buildings	1,999,903.27	116,793.48	64,336.14	181,129.62	2,181,032.89
Research and investigation	8,785,887.96	629,282.18	771,181.28	1,400,463.46	10,186,351.42
Highways and Parks Magazine	1,239,352.21	138,831.59	142,593.75	281,425.34	1,520,777.55
Public relations	1,309,578.88	208,865.33	201,326.01	410,191.34	1,719,770.22
Sub-total	$611,178,926.15	$46,664,759.47	$51,975,668.34	$98,640,427.81	$709,819,353.96
Transfers—					
User administration costs	$34,356,448.81	$4,349,669.18	$5,065,129.71	$9,414,798.89	$43,771,247.70
Revolving fund	500,000.00	.....	.....	.....	500,000.00
Total expenses	$646,035,374.96	$51,014,428.65	$57,040,798.05	$108,055,226.70	$754,090,601.66

TABLE 14

Reconciliation With State Controller

Fiscal Year 1969—	
Highway fund balance—July 1, 1968	$8,500,258.94
Plus—	
Gross receipts	+52,967,689.09
Less—	
User administrative costs	—4,349,669.18
Highway direct expenditures	—46,664,759.47
Sub-total	$10,453,519.38
Plus—	
Expenditures in transit	+3,190,279.85
Less—	
Deposits in transit	—63.12
Controller's balance—June 30, 1969	$13,643,736.11
Fiscal Year 1970—	
Highway fund balance—July 1, 1969	$10,453,519.38
Plus—	
Gross receipts	+60,439,675.65
Less—	
User administrative costs	—5,065,129.71
Highway direct expenditures	—51,975,668.36
Sub-total	$13,852,396.96
Plus—	
Expenditures in transit	+3,390,919.22
Less—	
Deposits in transit	—3,357.85
Controller's balance—June 30, 1970	$17,239,958.33

TABLE 15

Comparison—Last 10-Year Period, Construction and Engineering Expenditures

Fiscal Year	Contractor's payments	Construction engineering	Preliminary engineering	Right-of-way, including acquisition	Sub-total	Additions and betterments	Research and investigation	Total construction and engineering
1961	$11,067,884.63	$1,401,860.62	$1,616,167.39	$861,184.07	$14,947,096.71	$552,478.19	$503,880.02	$16,003,454.92
1962	15,174,577.23	1,880,994.87	1,715,583.89	1,488,413.98	20,259,569.97	576,260.15	537,776.07	21,373,606.19
1963	19,604,365.76	2,366,989.79	1,958,511.80	1,969,019.52	25,898,886.87	782,869.81	532,873.86	27,214,630.54
1964	29,614,363.98	3,782,837.13	2,499,803.66	5,860,308.07	41,757,312.84	779,091.88	661,723.61	43,198,128.33
1965	36,679,386.51	4,077,274.87	2,547,172.71	8,520,012.55	51,823,846.64	812,737.47	609,425.10	53,246,009.21
1966	20,770,342.09	3,465,983.03	2,544,180.57	15,174,303.56	41,954,809.25	1,048,803.02	628,472.84	43,632,085.11
1967	22,488,063.00	3,327,880.78	2,293,440.04	11,099,719.11	39,209,102.93	979,991.72	669,789.81	40,858,884.46
1968	21,768,876.50	3,616,966.13	2,296,915.92	6,790,098.90	34,472,857.45	1,101,506.86	676,810.19	36,251,174.50
1969	21,389,545.64	3,506,337.98	2,126,736.94	6,239,865.73	33,262,486.29	1,096,632.48	629,282.18	34,988,400.95
1970	25,616,160.50	3,669,120.13	2,408,829.25	5,063,868.37	36,757,978.25	1,277,873.81	771,181.28	38,807,033.34

TABLE 16

Historical Record of Federal Participation—1917–1970

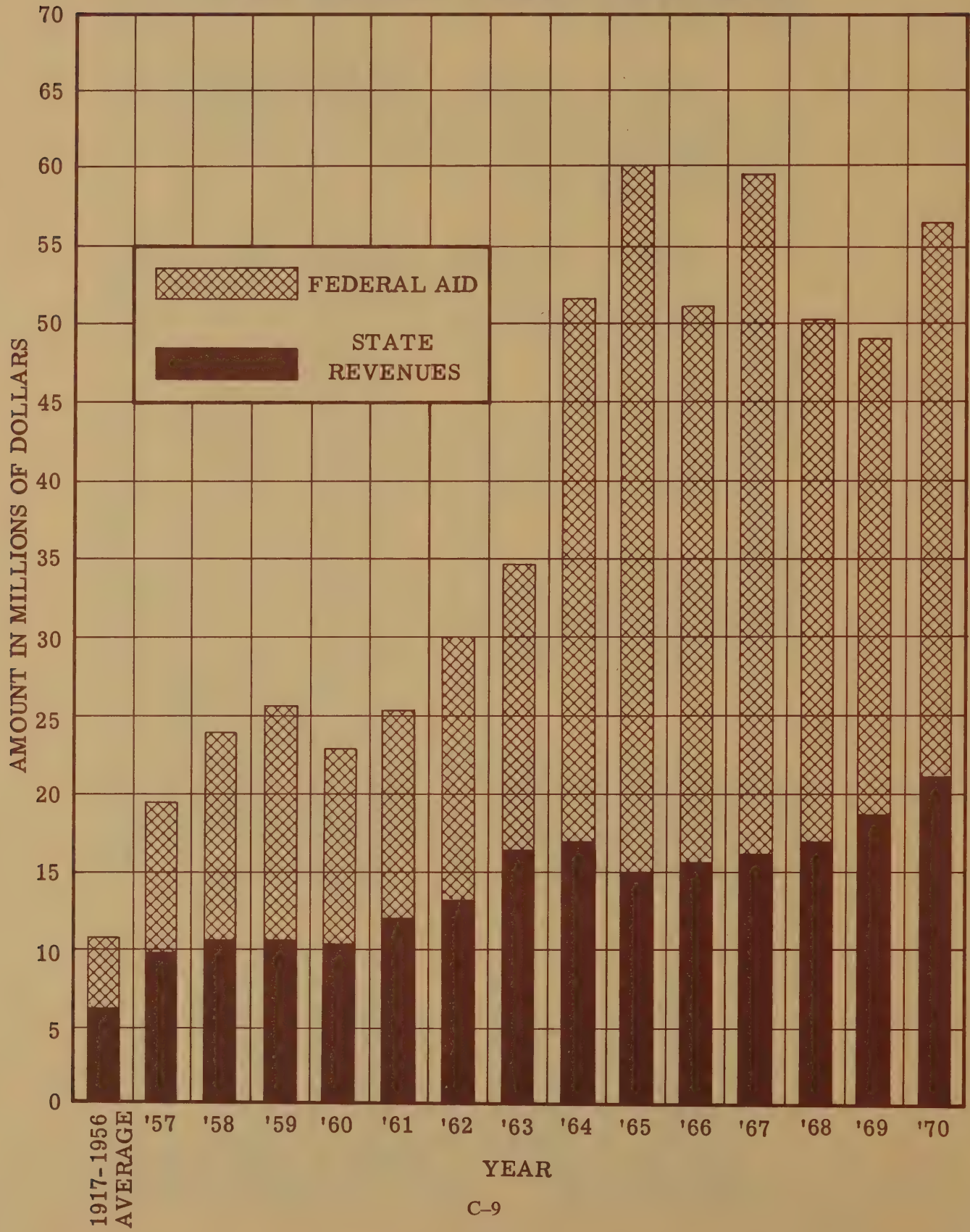
Fiscal year	Construction, construction engineering	Research and investigation (planning)	Right-of-way	Preliminary engineering	Total federal aid
1917–1960	$141,895,290.81	$1,993,479.31	$778,621.00	$1,624,134.00	$146,291,525.12
1961	10,948,751.00	485,171.00	316,045.00	501,271.00	12,251,238.00
1962	14,230,517.00	376,774.00	301,124.00	755,569.00	15,663,984.00
1963	16,021,340.00	354,751.00	1,461,770.00	467,671.00	18,305,532.00
1964	28,129,856.00	324,394.00	4,394,288.00	1,771,232.00	34,619,770.00
1965	34,676,786.00	278,120.00	7,057,811.00	3,019,165.00	45,031,882.00
1966	22,262,042.00	269,222.00	10,096,286.00	2,945,800.00	35,573,350.00
1967	26,330,722.00	444,739.00	14,235,640.00	1,755,776.00	42,766,877.00
1968	19,927,176.00	322,178.00	3,086,335.00	903,700.00	24,239,389.00
1969	21,769,431.00	380,932.00	6,014,645.00	1,605,887.00	29,770,895.00
1970	25,753,267.00	704,949.00	6,160,565.00	1,372,455.00	33,991,236.00
1917–1970	$361,945,178.81	$5,934,709.31	$53,903,130.00	$16,722,660.00	$438,505,678.12

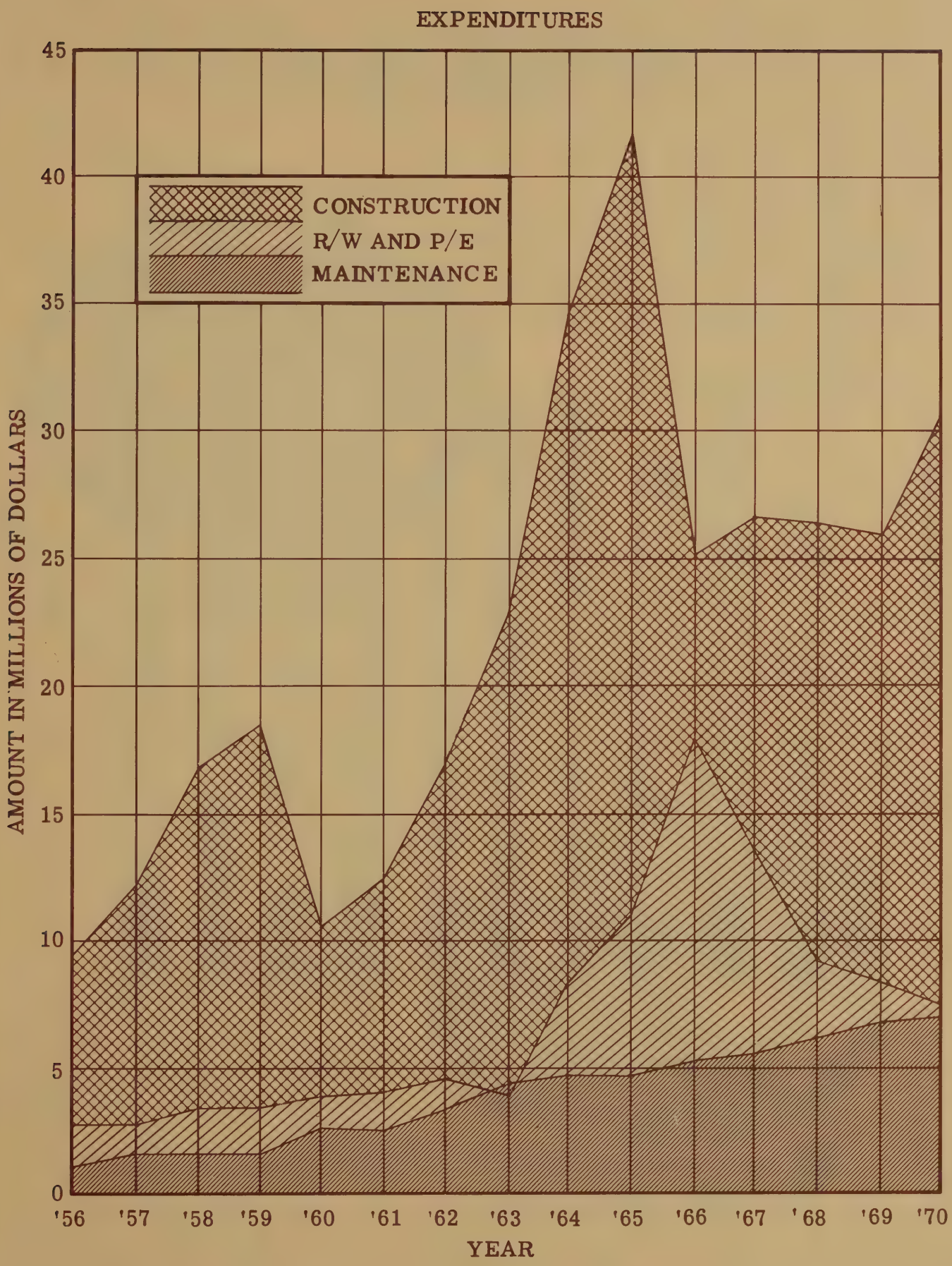
TABLE 17

Federal Funds Received by System Type and Class of Funds

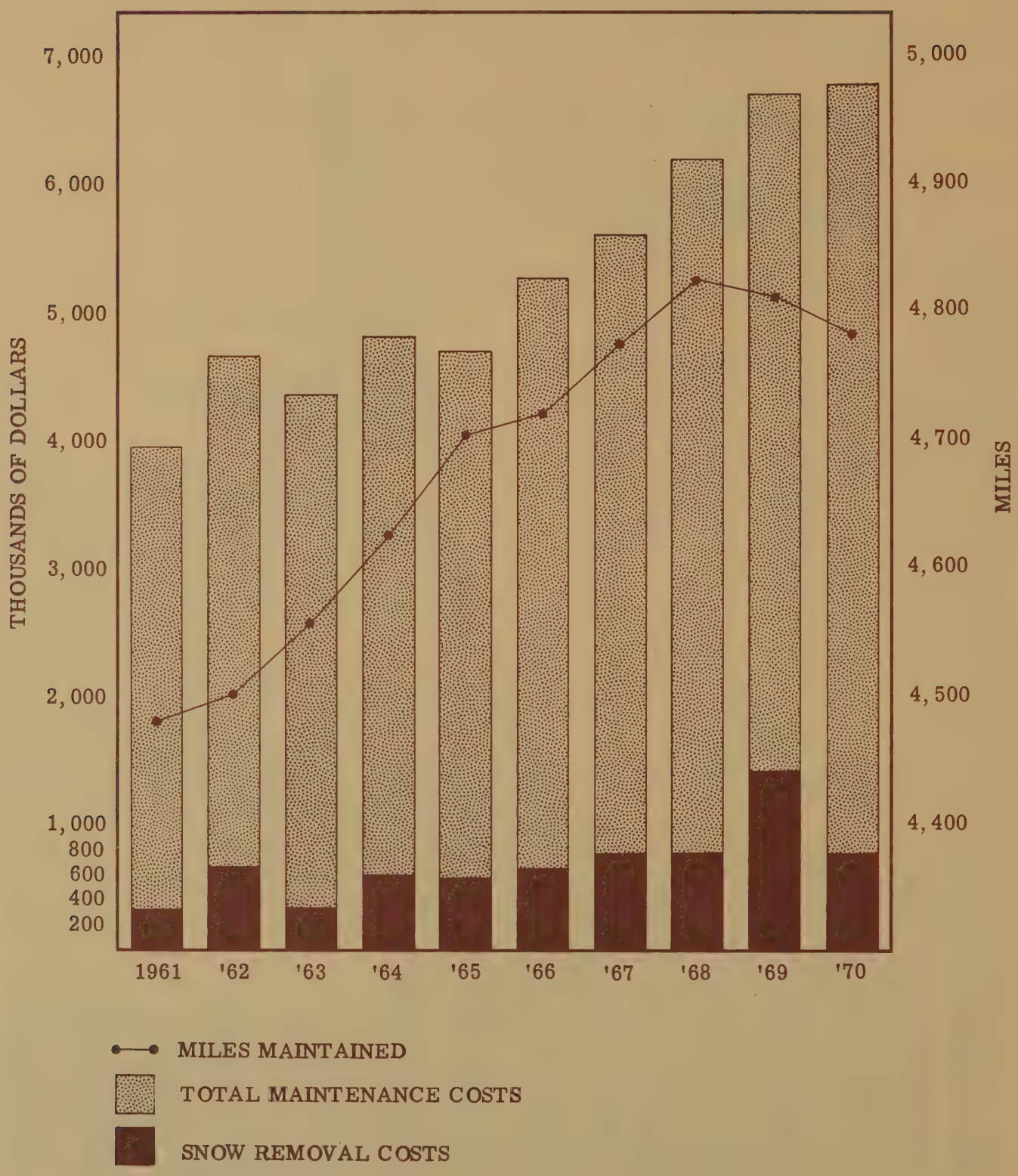
Description	1966	1967	1968	1969	1970	Totals
Interstate system funds—						
Right-of-way	$8,558,946.00	$11,665,345.00	$2,692,371.00	$4,032,633.00	$4,489,613.00	$31,438,908.00
Preliminary engineering	1,971,571.00	1,229,608.00	524,950.00	593,154.00	684,273.00	5,003,556.00
Construction	12,669,605.00	16,811,645.00	11,696,917.00	12,035,422.00	13,481,268.00	66,694,857.00
Construction engineering	1,527,020.00	1,760,342.00	1,211,157.00	1,100,814.00	1,098,826.00	6,698,159.00
Total interstate funds	$24,727,142.00	$31,466,940.00	$16,125,395.00	$17,762,023.00	$19,753,980.00	$109,835,480.00
Primary system funds—						
Right-of-way	$1,184,525.00	$1,550,546.00	$277,299.00	$1,544,515.00	$1,598,164.00	$6,155,049.00
Preliminary engineering	633,742.00	265,867.00	246,062.00	687,355.00	484,539.00	2,317,565.00
Construction	2,624,108.00	3,380,932.00	3,319,790.00	5,046,323.00	8,475,176.00	22,846,329.00
Construction engineering	373,691.00	555,944.00	503,640.00	817,379.00	519,328.00	2,769,982.00
Total primary funds	$4,816,066.00	$5,753,289.00	$4,346,791.00	$8,095,572.00	$11,077,207.00	$34,088,925.00
Secondary system funds—						
Right-of-way	$329,503.00	$703,097.00	$80,216.00	$120,765.00	$62,906.00	$1,296,487.00
Preliminary engineering	317,594.00	260,301.00	128,908.00	321,322.00	176,186.00	1,204,311.00
Construction	4,185,439.00	3,256,323.00	2,362,336.00	2,304,929.00	1,592,673.00	13,701,700.00
Construction engineering	461,045.00	413,202.00	355,412.00	263,960.00	260,760.00	1,754,379.00
Total secondary funds	$5,293,581.00	$4,632,923.00	$2,926,872.00	$3,010,976.00	$2,092,525.00	$17,956,877.00
Urban system funds—						
Right-of-way	$23,312.00	$316,652.00	$36,449.00	$316,732.00	$9,882.00	$703,027.00
Preliminary engineering	22,893.00	.....	3,780.00	4,056.00	27,457.00	58,186.00
Construction	383,061.00	109,453.00	463,146.00	137,691.00	259,091.00	1,352,442.00
Construction engineering	38,073.00	42,881.00	14,778.00	62,913.00	66,145.00	224,790.00
Total urban funds	$467,339.00	$468,986.00	$518,153.00	$521,392.00	$362,575.00	$2,338,445.00
Highway planning funds	$269,222.00	$444,739.00	$322,178.00	$380,932.00	$704,949.00	$2,122,020.00
Grand total	$35,573,350.00	$42,766,877.00	$24,239,389.00	$29,770,895.00	$33,991,236.00	$166,341,747.00

FEDERAL AID AND STATE REVENUES BY FISCAL YEARS 1917-1970



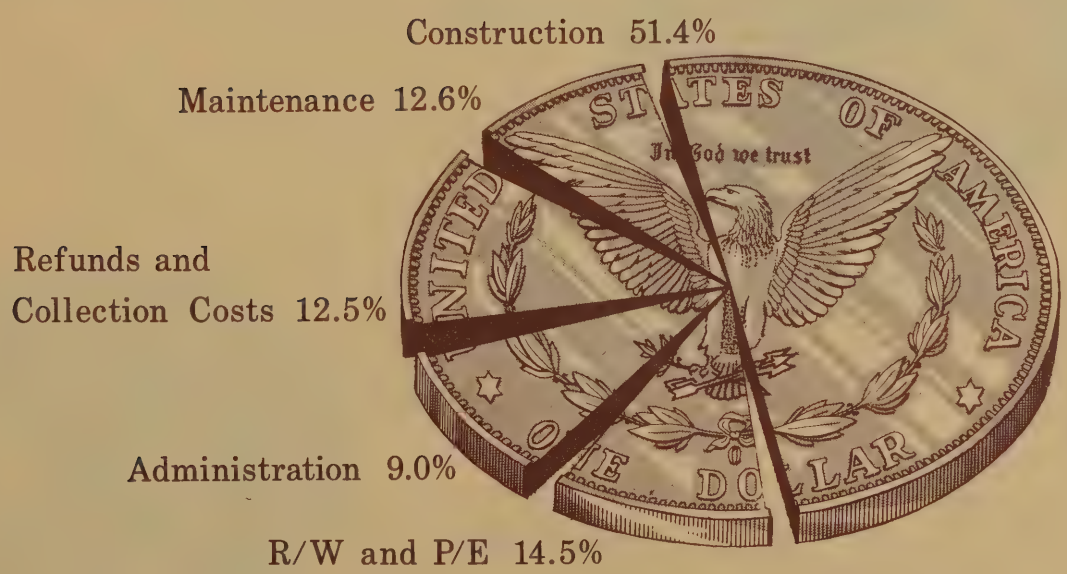

EXPENDITURES
CONSTRUCTION
R/W AND P/E
MAINTENANCE
AMOUNT IN MILLIONS OF DOLLARS
45
40
35
30
25
20
15
10
5
0
'56
'57
'58
'59
'60
'61
'62
'63
'64
'65
'66
'67
'68
'69
'70
YEAR

COMPARATIVE MAINTENANCE COSTS



RECEIPTS AND DISBURSEMENTS BIENNIUM

RECEIPTS



DISBURSEMENTS

EXPENDITURE PERCENTAGES BY SYSTEM TYPE

Construction 68.4%

R/W & P/E 25.7%

Maintenance 5.9%

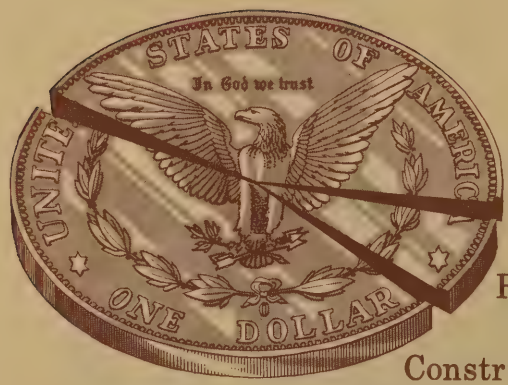
INTERSTATE

Construction 70.2%

Maintenance 23.2%

R/W & P/E 6.6%

PRIMARY



Maintenance 42.9%

R/W & P/E 8.8%

Construction 48.3%

SECONDARY

R/W & P/E 23.4%

Maintenance 6.5%

Construction 70.1%

URBAN

APPENDIX D

Materials and Testing

TABLE 18

Structural Materials Laboratory

Air entraining agents—2 × 12 + 6=30
Hollow masonry units—274 + 90=364
Brick—30
Curing seals—1
Concrete beams—79
Concrete cylinders—7,114
Coarse aggregate—161 × 5=805
Concrete cores—71
Cements—539 × 5=2,695
Fine aggregate—95 × 7=665
Water—12
Pipe cores—49 × 2=98
Epoxy—1
Expansion joint—51
Reinforcing steel—1,512 × 3=4,536
Mortar sand—7 × 7=49
Chairs—31
Riprap—3
Total samples—10,032
Total tests—16,635

TABLE 19

Chemical and Metallurgical Laboratory

Material tested	Number of Samples 1969	1970	Total	Number of tests each sample	Total
Fence posts, wood	9	0	9	4	36
Fence posts, metal	33	32	65	5	325
CMP	423	299	722	4	2,888
Barbed wire	11	9	20	4	80
Farm fence	3	7	10	4	40
Chain link fence	11	9	20	3	60
Conduit	53	48	101	2	202
Timber burial	2	2	4	2	8
Target plates and guide posts	3	1	4	8	32
Paint, contract	13	22	35	8	280
Paint, traffic	20	28	48	8	384
Water pipe	0	19	19	4	76
Steel, structural	0	0	0	0	0
Steel, reinforcing	126	0	126	3	378
Cement	241	283	524	10	5,240
Wire, electrical	72	102	174	2	348
Water	12	32	44	7	308
Soil analysis	34	115	149	5	745
Fertilizers	11	0	11	6	66
Alkali reactivity	2	0	2	4	8
Structural plate	14	0	14	4	56
Pipe	27	31	58	4	232
CTB	0	133	133	3	399
Spectrographic analyses	44	135	179	4	716
Adhesives	7	1	8	3	24
Additives	0	3	3	4	12
Miscellaneous	50	30	80	5	400
Total			2,562		13,343

TABLE 20

Roadbed Aggregates Laboratory

Material tested	Number of Samples 1969	1970	Total	Number of tests per sample	Total
Preliminary pit samples	1,639	2,823	4,462	8 (avg.)	26,772
Selected material base	0	8	8	6	48
Borrow	577	172	749	6	4,494
Finished products	23	20	43	5	215
State and BPR record samples	171	146	317	5	1,585
CTB	228	38	266	5	1,330
Miscellaneous test for other sections	216	68	284	2	568
Backfill	11	13	24	5	120
Special tests	30	24	54	2.02	109
Subgrade samples	1,171	373	1,544	5	7,720
"R" value preliminary preparation	657	502	1,159	6	6,954
Three-way audit samples	12	13	25	5	125
Lime treatments on pit aggregate	0	24	24	6	144
Riprap	26	11	37	5	185
Preparation of coarse aggregate for concrete	58	30	88	3	264
Total					50,633

TABLE 21

Bituminous Mix Design Laboratory

Materials tested	Number of Samples 1969	1970	Total	Number of tests per sample	Total
Preliminary pits	86	106	192	24	4,608
Production samples (gravel)	66	61	127	18	2,286
Production samples (bituminous)	21	19	40	4	160
Admixture blends	18	1	19	20	380
Open graded and screenings	43	52	95	4	380
Immersion compression tests	62	0	62	19	1,178
Water permeability, swell and absorption	114	126	240	5	1,200
Research	42	7	49	Vary	882
Total number of samples	452	372	824		
Total number of tests					11,074

TABLE 22

Soils Laboratory

	Number of Samples			Number of tests each sample	Total
	1969	1970	Total		
Aggregate degradation	97	124	221	2	442
Calculated maximum density	39	24	63	5	315
Compacted density, HMCT	39	24	63	4 (avg.)	252
Hveem stabilometer "R" value	657	502	1,159	12	13,908
Soluble salts	216	139	355	3	1,065
Subgrades	1,348	339	1,687	5	8,435
Water permeability	4	0	4	2	8
Natural moisture	75	92	167	4	668
Specific gravity	44	74	118	1	118
Unit weight determination	0	39	39	1	39
Total					25,250

TABLE 23

Asphalt (Bituminous) Laboratory

Material tested	Number of samples	Number of tests per sample	Total
Asphaltic cement	1,666	5	8,330
Liquid asphalt	756	5	3,780
Bituminous mix	199	2	398
Emulsified asphalt	138	3	414
Total number of samples	2,759		
Total number of tests			12,922

TABLE 24

Cement Treated Base Laboratory

	1969	1970	Total	Number of tests each	Total
CTB design	16	14	30	25	750
CTB research	0	8	8	10	80
					830

TABLE 25

Research and Investigation Section

Special Reports—

1 Plantmix base production controls.
2 Investigation of reclamite seal applications.
1 Record of settlement, Maynard Lake.
1 Investigation of the plantmix surface condition—Glenbrook to Spooner Summit.
2 104(b)5 study—1970 estimate of I–80 and I–15 designed prior to 1963.
1 Installation of fluid level settlement devices on Contract 1287.
1 Depth of asphalt, Contract 1303.
1 Spring area, S 620, from 16 miles to 7 miles west of Orovada.
1 Exploration and sampling of the Cavanaugh-Douglas Pit, Reno.
1 Proposed alignment of U.S. 395, 1 mile Northwest of junction Stead AFB road to California-Nevada line.
1 Reports of tests on lignin sulfonate as a soil stabilizing agent.
1 Settlement areas east end of Carlin Canyon.
5 Investigation of modified open graded plantmix surfacing.
1 Investigation of flood damage repair on U.S. 95 near Beatty.
4 Investigation of accident locations.
1 Foundation study—Lovelock area.
1 Investigation of unstable subgrade areas—Contract 1280.
1 Study of skid resistance of Portland Cement concrete pavement.
1 Summary and analysis of skid resistance studies in Nevada.
1 Deterioration of grooved pavements.
1 Compaction methods on asphalt concrete pavement.
1 Preliminary investigation of lages to Currie pavement test section.
1 Use of ionic solutions to stabilized subgrade soils.
1 Compaction control methods.

Preliminary Roadbed Design Completed—

11 Interstate and urban projects including rest areas.
19 Primary and secondary projects.
5 Overlay projects.

Tests	Number of Tests 1969	1970	Total
Skid resistance	583	624	1,207
Air permeability	98	323	421
Nuclear density moisture	77	34	111
Consolidation	0	16	16
			1,755

New Test Methods Written—

Nev. T103 Relative Compaction of Soils by the Area Concept Utilizing Nuclear Gages.
Nev. T107 Apparent Specific Gravity of Porous Aggregates.
Nev. T232 Degradation of Aggregate by Air Dispersion in Water.

15 Nevada Test Methods revised and/or expanded.

TABLE 26

Elko Laboratory[1]

Concrete cylinders		676
Concrete "chairs"		11
Concrete building blocks		5
Bituminous cores		13
Final record samples		4
Total number of tests		709

[1]One year of operation.

TABLE 27

Las Vegas Laboratory

Concrete cylinders		2,633
Concrete aggregates (total)		6
(a) Coarse	2	
(b) Fine	4	
Asphaltic cements		226
Liquid asphalts		147
Emulsified asphalts		12
State final record samples		159
Reinforced concrete pipe		20
Stockpile testing		3
Borrow pits	(6)	
Number of samples		41
Total number of tests		3,247

APPENDIX E

Maintenance

TABLE 28

Contract Maintenance

FISCAL YEAR 1969

County	Contract Number	Description	Mileage	Cost
Eureka	1278[1]	35.3 miles north to 40 miles north of Eureka on S.R. 51	4.74	$197,895
Eureka	1311	S.R. 51 from 40 to 50 miles north of Eureka	.10	522,623
Douglas	1316	U.S. 50 from California-Nevada line to Round Hill (approximately)	2.00	35,000
Elko	1325	U.S. 40 in Elko from 3rd street to 2.02 miles northeast	2.00	211,977
Clark	1304[2]	Main street in North Las Vegas and U.S. 395 from Charleston Blvd. to Henderson	12.8	388,919
				$1,356,414

FISCAL YEAR 1970

County	Contract Number	Description	Mileage	Cost
Mineral	1327	U.S. 95 from NCL Hawthorne to 2.14 miles north	2.14	$126,801
White Pine	1344	U.S. 93 widening East Ely overpass	.....	72,438
Elko	1348	U.S. 93 stabilization and resurfacing from 9 to 19 miles north of Wells	10.0	623,846
Washoe	1351	I–80 modified open-graded, Nevada-California line to 1.61 miles east of Lawtons Interchange	9.33	223,508
Lander	1352	S.R. 8A from 11.7 miles south to 4.7 miles south of junction with U.S. 40 in Battle Mountain	7.0	285,119
				$1,331,712

[1]Contracted May 16, 1968. Completed Sept. 16, 1968.
[2]Contracted March 27, 1969. Completed July 14, 1969.

TABLE 29

Capital Improvements

FISCAL YEAR 1969

County	Contract Number	Description	Cost
Elko	1281	Laboratory building at Elko headquarters	$87,870
Carson City	1289	Addition to headquarters lab	42,600
Churchill	1272	Maintenance station at Cold Springs on U.S. 50	184,988
Clark	1300	Maintenance station at Mt. Charleston	158,700
Elko	1301	Additions to Elko headquarters office and equipment parts storage building	97,340
Carson City	1302	Comfort station in local rest area	24,300
			$595,798

FISCAL YEAR 1970

County	Contract Number	Description	Cost
Eureka	1320	Comfort station near Eureka	11,242
Nye	1321	Maintenance office building in Tonopah headquarters	82,495
Clark	1322	Addition to Las Vegas district office building	107,770
Eureka	1329	Improvement to Eureka maintenance station	22,980
Eureka	1330	New maintenance station at Emigrant Pass	220,000
Lyon	1336	New shop building at Fernley maintenance station	83,994
			$528,481

APPENDIX F

Bridge

TABLE 30

Structure Summary

Summary by type	Number of Structures Built by State Highway: Constructed or under construction as of June 30, 1968	Constructed during biennium or under construction June 30, 1970	Structures abandoned during biennium	Total as of June 30, 1970	Structures on highway system not built by State Highway Department	Total structures as of June 30, 1970
Plain concrete	4	0	0	4	0	4
Reinforced concrete	509	70	6	573	14	587
Structural steel	40	3	1	42	15	57
Timber	17	0	1	16	3	19
Composite structures (reinforced concrete structural steel)	19	1	0	20	0	20
Prestressed concrete	31	4	0	35	0	35
Structural plate pipe	2	0	0	2	0	2
Multiple pipe	4	0	0	4	1	5
Tunnels	0	0	0	0	2	2
Total	627	78	8	696	35	731
Total length of structures in feet	64,401	15,575	1,052	78,924	5,804	84,728
Average length of bridge in feet	103	200	132	113	166	116
SUMMARY BY PURPOSE						
Bridges over waterways	352	15	6	361	26	387
Railroad grade separation	60	11	1	70	3	73
Interchange structures	144	29	0	173	0	173
Highway grade separation	69	20	0	89	2	91
Pedestrian structures	1	3	1	3	2	5
Tunnels	0	0	0	0	2	2
Total	627	78	8	696	35	731

TABLE 31

Structures by Counties

County	Bridges over waterways	Railroad grade separation structures	Interchange structures	Highway grade separation structures	Pedestrian	Tunnels	Total
Carson City	2	0	0	0	0	0	2
Churchill	34	0	6	2	0	0	42
Clark	128	32	54	20	1	0	235
Douglas	24	0	0	0	0	2	26
Elko	57	10	18	21	0	0	106
Esmeralda	3	0	0	0	0	0	3
Eureka	13	6	7	2	0	0	28
Humboldt	12	4	15	6	0	0	37
Lander	9	0	2	4	0	0	15
Lincoln	13	2	0	0	0	0	15
Lyon	20	4	4	4	0	0	32
Mineral	4	0	0	0	0	0	4
Nye	15	0	2	0	0	0	17
Pershing	11	1	16	4	0	0	32
Storey	2	1	0	0	0	0	3
Washoe	37	11	49	28	3	0	128
White Pine	3	2	0	0	1	0	6
Totals	387	73	173	91	5	2	731

APPENDIX G

Traffic

TABLE 32

Highway Lighting and Traffic Signal Systems

Contract Number	Location	Type system	Date awarded	Cost
1284	Las Vegas Downtown Expressway ramp terminals	Signals	8– 8–68	$160,000.00
1285	Paradise Road and Tropicana Road	Signal	8– 8–68	39,189.35
1293	Sahara Avenue and Commercial Center Drive	Signal	9–26–68	20,668.25
1309	I–15 ramp terminals (Charleston to Bonanza)	Signals and Lighting	5– 1–69	186,100.00
1313	I–80 ramp terminals (Sparks)	Signals and Lighting	6–29–69	175,000.00
1314	South Virginia St. and Moana Lane	Signal	6–19–69	90,000.00
	South Virginia St. and Plumb Lane	Signal		
1326	Nellis Blvd. and Boulder Highway	Signal	8–21–69	112,625.00
1338	Civic Center and Cheyenne	Signals and Lighting	1–22–70	25,660.00
	I–15 ramp terminals (Cheyenne)	Lighting	1–22–70	50,000.00
	I–15 Craig Road Interchange	Lighting	1–22–70	14,460.00
1343	Battle Mountain traffic signal	Signal	2–26–70	11,462.00
1349	North Virginia and North Sierra	Signal and Lighting	4–24–70	23,000.00

APPENDIX H

Legal

TABLE 33

Condemnation Litigation

Parcels referred for condemnation	39
Parcels purchased after condemnation referral	18
Condemnation cases filed	46
Cases settled	44
Cases appealed	5
Cases tried	19
Pending condemnation cases July 1, 1968	67
Pending condemnation cases July 1, 1970	49

TABLE 34

Tort Litigation

Claims filed against the Department	40
Suits filed against the Department	15
Cases settled or dismissed	5
Cases tried	3
Cases pending	12
Cases on appeal	0

SPO, Carson City, Nevada, 1970

08018455